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A JOURNAL
OF MANUFACTURING
INDUSTRY

THE Inventive Age AND
PATENT INDEX.

AND SCIENTIFIC PROGRESS.

SIXTEENTH YEAR,
No. 1.

WASHINGTON, D. C.—JANUARY, 1904.

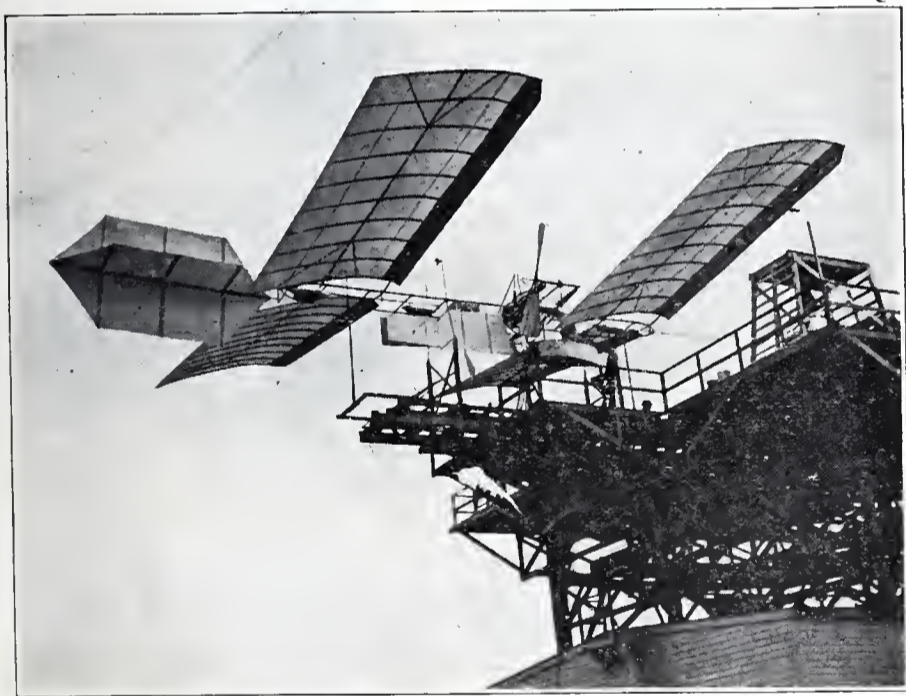
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THE LANGLEY AIRSHIP.

PROFESSOR SAMUEL P. LANGLEY, of the Smithsonian Institute, Washington, D. C., has been very prominent in the public eye for some time past because of the elaborate experiments carried on in connection with his proposed flying machine or air ship, which, however, up to the present time has proven to be an utter failure. Prof. Langley claims however that the defect does not reside in the machine itself, but in the mechanism that has been employed to launch it into the air.

Prof. Langley has spent the best part of his life working out the problem of aerial navigation, and has contributed many valuable papers to science on this

were believed to afford the best conditions attainable for either success or failure. The houseboat is an important part of the airship apparatus, as it is from its roof the ship is launched. In order to prevent any trouble whatever, Prof. Langley had caused to be constructed a huge system of trestlework and platforms on the top of his houseboat, and on this rested the tracks for the launching car. The base of the tracks is fixed in such a manner that it can be turned in any direction, like a turntable. The tracks project over the rear end of the houseboat, and at this point are so fixed that when the car is shot from the opposite end by means of steel springs, and has reached the extreme



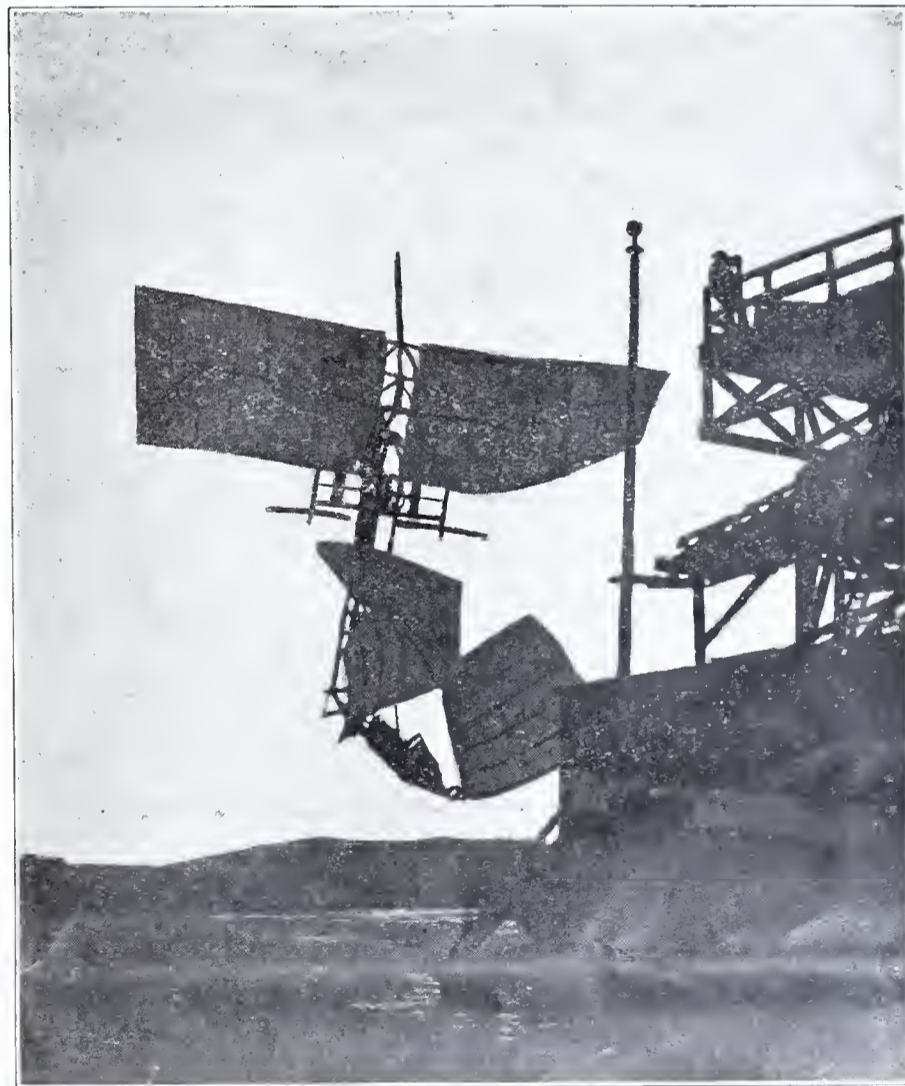
THE AIRSHIP ON THE HOUSEBOAT.

subject. He is probably the foremost authority in the world on aerodromes and aeroplanes, and has been experimenting with machines for many years. The one that has recently proven such a fiasco represents the results of these years of experiment and study, and demonstrates clearly in the minds of many that the airship of commerce has not yet arrived. The expense of the experiments that have been carried on has been borne by the United States government, an appropriation of \$50,000 having been used for the purpose.

It has been known in a general way for years that Prof. Langley was interested, and had been experimenting in the art of flying through the air without the use of balloons for sustaining power, arguing that if birds could soar for hours with apparently immovable wings, man, who should "have dominion over the fowl of the air," (Genesis I-28) could, by the use of properly arranged aeroplanes or artificial wings, equal their flight.

Consequently, when it was suddenly announced to the world at large that Prof. Langley had constructed a full sized sixty foot machine along the theories he had so long expounded, the world awaited with breathless interest the result of its trial, such interest being enhanced perhaps by the fact that the government had put \$50,000 into the experiment.

Early in the summer of 1903 a huge houseboat with an enormous scaffolding on top was towed from one of the wharves at Washington to a point down the Potomac River known as Widewater, Va., where a liberal unobstructed expanse of air above, and a fairly easy bed of water below,

THE AIRSHIP IN ITS FLIGHT FROM THE HOUSEBOAT TO THE
WATER.

end of the track, the car and track alike collapse and leave the ship in the air, with no support other than that provided by its own wings, aeroplanes and propellers. The track is built so that the airship shall be entirely clear of anything that may tend to prevent a flight.

After reaching its destination, the machine on which mechanics had been at work for months, was carefully completed inside the houseboat. The utmost secrecy was observed, and no one not connected with the airship project was permitted to board the houseboat or get within sight of the aerodrome. The windows in the boat were kept tightly closed all day and at night. There were

half a dozen or more workmen employed on the construction.

The first test was made with a model of the larger machine within a few weeks after the boat left its pier in the city, and proved to be a comparative failure, but gave encouragement to the promoters. Then came a long delay caused partly perhaps by the changes deemed necessary from the results of the flight of the model, but mostly by the attempt to tire out and get rid of the numerous reporters who patiently watched and waited for the crucial test of the big machine.

The gentlemen of the pen, however, proved to have excellent "staying qualities," and autumn found them still there. Prof. Langley therefore apparently came to the conclusion that if anything was to be done before winter set in, it was time to do it; so on October 7th the machine was carefully hoisted to place, the wings adjusted, the engines started and the operator Prof. Charles M. Manly, also of the Smithsonian Institution, took his place within the car.

The aerodrome just prior to its start is shown in the first illustration. The main features to be noted are the light skeleton frame constructed of slender steel tubing and wooden supports, the enormous sets of wings, sixty feet in length, the tail or rudder and the intermediate propellers, driven by a powerful but extremely light engine devised by Prof. Manly.

On the occasion of its first trial, the airship raised itself above the launching mechanism, and is said to have flown about a hundred yards when it suddenly took a downward turn, and dove to the bottom of the river carrying its operator with it. He escaped injury however, and was soon rescued. It was found that the machine was merely a tangled wreck, though the engines were intact. The whole was pulled aboard the houseboat and the latter soon after was towed back to Washington. The failure to fly was explained to be due to the fact that there was a slight projection on the track, which caught in the ship itself during the launching. The fact that the ship, as well as the model, did fly a short distance encouraged Profs. Langley and Manly to hope that their work was not in vain. They brought the boat back, therefore, for the purpose of correcting the defect in the track and to make another test.

Finding that it was in vain and involved useless expense to conduct experiments in secrecy, it was determined to launch the aerodrome in full sight of Washington or those who cared to look on. Accordingly when repairs and changes had been completed the only delay was caused by unfavorable weather. The wings and their supports are not attached to the machine until just before the time for the flight, and the propellers and other detachable parts are not assembled until after the machine has been placed on the launching car. To handle the heavy wings and canvass propellers in a strong wind is out of the question, according to the opinion of the experts.

The conditions proving favorable December 8th, the second, and up to the present time last, trial took place

and the houseboat was towed to a point just below the city.

The houseboat reached the proving grounds and came to a stop about 3 o'clock. The work of putting up the wings began as the boat was being brought down the river, and one wing had been adjusted and another was being put in place by the time the stop was made. The work of putting up the wings progressed slowly. The air was cold, and the sun was obscured by clouds during almost the entire period.

Prof. Langley, who had come aboard the houseboat just before she left the dock, was on the roof with Prof. Manly superintending the fitting of the wings, and with him were Brigadier General Wallace Randolph, chief of artillery, U. S. A., Major Macomb of the board of ordnance and fortifications of the army, Secretary Powell of this board, Dr. Nash and Photographer Smyllie of the Smithsonian Institution, as well as several other scientists who are interested in aerial navigation.

After everything had been made ready and Prof. Manly was ready to climb into the car, some little time was lost in getting the houseboat properly headed for the test. The boat was shifted about several times before the right position was obtained. Prof. Manly entered the car at about 4:30 and tested all the apparatus. He fixed himself in the proper position, turned on the engine that worked the propellers and rudder and at 4:45, exactly, called "Let her go," and the machine was launched.

The aerodrome kept a straight course as long as it was on the tracks on the houseboat, but the moment the tracks dropped, the machine twisted about in mysterious fashion. It looked as though it buckled in the middle and at the same time the rear wing supports snapped. It went almost straight down from the houseboat, cracking and snapping like a lot of bunting in the wind. The rear end plunged downward at right angles to the remainder of the machine, and the forward part was thrown high in the air, describing a circle over the rear end and falling in the water upside down.

Prof. Manly was buried beneath the pile of broken wire, wood, steel and linen. One of the workmen was standing on the deck of the houseboat when the machine struck the water, and he immediately dived after it to rescue Prof. Manly and pulled him out, with the assistance of those on the houseboat. Both men were hustled into the boat and wrapped in warm blankets. They soon recovered from the effects of their bath and Prof. Manly went to work to get the wreck of the flying machine back on the houseboat. The tide had been running out swiftly all afternoon, however, and when the attempt to raise the machine was made it was found to be partly buried in the shoals, and the houseboat itself was aground.

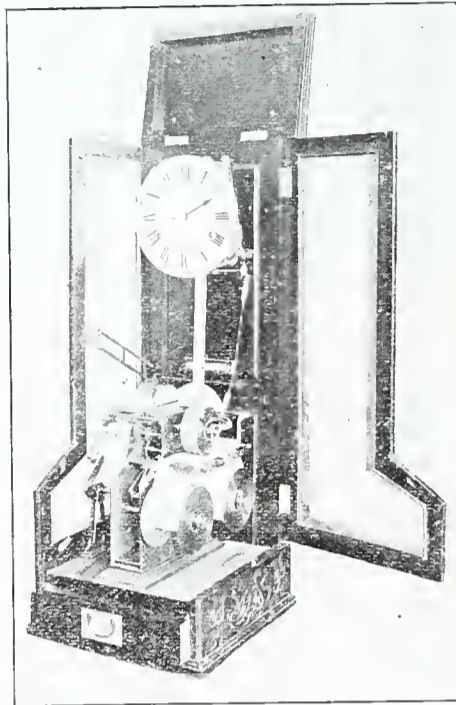
Prof. Langley was seen after the disaster, but refused to talk, except to say that the failure to work the launching apparatus properly was the cause of the fiasco.

Whether or not Prof. Langley will proceed further with his experiments, remains to be seen. It seems impossible in view of the absolute failures he has had, that he will be able to obtain any more government money and assistance; yet stranger things than that have happened with the people's pocketbook.

Theoretically the problem seems comparatively easy of solution when it is considered what the genus homo has done in other lines and when we daily see the flying machines of nature performing the feat without apparent effort. But it is an undeniable fact that man has not yet discovered the laws which govern the flight of the eagle and permit his poise or swoop without a perceptible change of opinion.

A NOVEL INSURANCE PLAN.

Some years ago a project was started in England with the object of insuring the great industrial population against accidents through the medium of a "penny-in-the-slot" machine.



The idea was excellent, but the basis of success was wanting—namely—a machine proof against fraud. It is plain that a machine which issues a ticket, and leaves it to the honor of the customer to write on it the time and date he buys it, is not quite good enough for the purpose, and would undoubtedly lead to the tickets being bought *after the accident*.

A machine has, however, now been invented which gets over the difficulty. It has the appearance of a handsome clock, and has, of course, the necessary slot into which you drop the penny and pull forward a handle when out drops a pencil (already sharpened), and an opening is disclosed through which you sign your name:—then you push back the handle, and simultaneously the space closes, an insurance policy is issued through another slot, and last but not least—against your signature inside the machine is printed the exact date and time (to the minute) when the policy is issued.

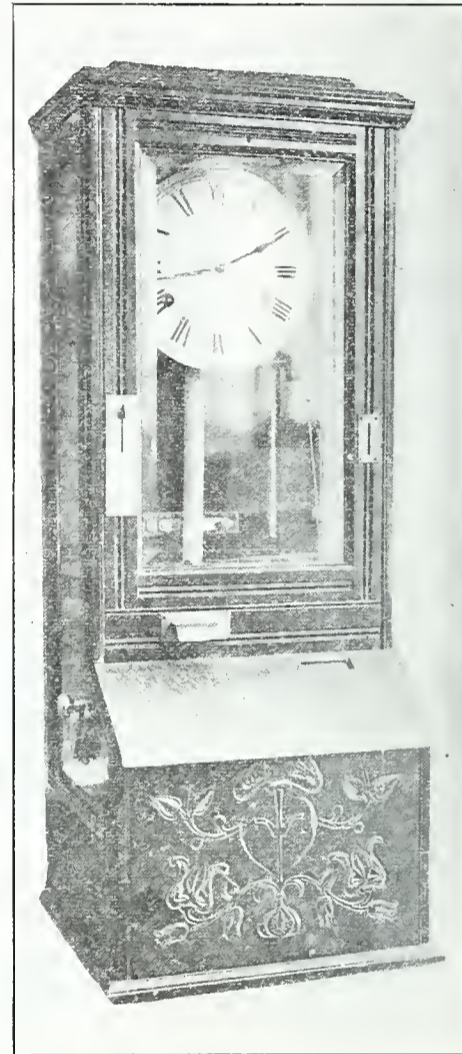
If you meet with an accident within seven days, you apply to the insurance company for your weekly allowance, and if your name is on the register retained by the machine, you get your money.

The owners of the patent intend placing the machines in factories, warehouses, mills, etc., where large numbers of employees are engaged, and have entered into a contract with one of the leading insurance companies to pay all the claims, thereby guaranteeing the fulfillment of the contract with the insuree, and at the same time placing themselves in the exceptional and enviable position of taking no risk and a certainty of large profits.

The promoters claim that industrial accident insurance has been palpably

neglected—owing to the immense cost of collection, (as in the case of all industrial life insurance) which has prevented any company from being able to give any practical benefit for one penny per week.

Besides giving good value for the money in the policy, arrangements are made with certain tradesmen in the neighborhood of each machine to allow a discount for one penny in the shilling on all goods bought from them up to four shillings, so that you get your insurance for nothing and three pence profit on each penny.



Anyone can insure up to the amount of their weekly wages—each penny invested providing ten shillings for a certain period.

The offices of the company are at No. 2 Staple Inn, London.

Silk From Wood.

A plant erected near Sydowsaue, Germany, is at present turning out fifty pounds of skein silk a day, produced from wood pulp. The silk is soft in texture, and cream in color. Each thread is made up of eighteen single strands: a single strand is hardly perceptible to the naked eye. In strength, the real silk is two-thirds stronger than the imitation. When woven into pieces, the new substitute is said to have the appearance of real silk. How this new article will compare with the genuine, in the matter of wear and price, it is impossible at present to state. The manufacturing process is likewise undiscoverable. It is asserted, however, that the pulp undergoes a chemical process and is pressed through very fine tubes, by hydraulic pressure, forming the single strands which go to make up the thread.

BILL No. 184.

AN ACT TO AMEND THE PATENT ACT.

(This Act received Royal assent August 13th, 1903.)

His majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

Powers of Deputy Commissioner of Patents.
R. S. C., c. 17.

1. The Deputy Commissioner of Patents may do any act or thing, whether judicial or ministerial, which the Commissioner of Patents is authorized or empowered to do by any provision of *The Patent Act*, (hereinafter referred to as the said Act,) or by any Act in amendment thereof; and, in the absence of the Deputy Commissioner any person performing the duties of the Deputy Minister of Agriculture pursuant to section 14 of *The Civil Service Act* may, as Acting Deputy Commissioner, do any such act or thing.

R. S. C., c. 61, s. 8 amended. Expiry of Patents.

2. The section substituted for section 8 of the said Act, by section 1 of chapter 24 of the statutes of 1892, is amended by striking out all the words after the word "inventor" in the thirteenth line thereof.

2. Notwithstanding anything contained in the said section 8, or in the said substituted section, no Canadian patent heretofore issued, except as provided for in section 16 hereof, shall be deemed to have expired before the end of the term for which it was granted merely because of the expiry of a foreign patent for the same invention.

Section 37 Repealed.

3. Section 37 of the said Act, as heretofore amended, is repealed, and the provisions of sections 4, 5, 6, 7 and 8 of this Act are substituted therefor.

Patent conditional. Manufacture in Canada within two years. Importation prohibited.

4. Every patent granted under the said Act shall, unless otherwise ordered by the Commissioner as hereinafter provided, be subject, and expressed to be subject, to the following conditions:—

(a.) Such patent and all the rights and privileges thereby granted shall cease and determine, and the patent shall be null and void, at the end of two years from the date thereof, unless the patentee or his legal representatives, within that period or an authorized extension thereof, commence, and after such commencement continuously carry on in Canada, the construction or manufacture of the invention patented, in such a manner that any person desiring to use it may obtain it, or cause it to be made for him at a reasonable price, at some manufactory or establishment for making or constructing it in Canada.

(b.) If, after the expiration of twelve months from the granting of a patent, or an authorized extension of such period, the patentee or patentees, or any of them, or his or their or any of their legal representatives, for the whole or a part of his or their or any of their interest in the patent, imports or import or causes or cause to be imported into Canada, the invention for which the patent is granted, such patent shall be void as to the interest of the person or persons so importing or causing to be imported.

Term for manufacture in Canada may be extended.

5. Whenever a patentee is unable to commence or carry on the construction or manufacture of his invention within the two years limited by paragraph (a) of section 4 of this Act, the Commissioner may, at any time not more than three months before the expiration of that term, grant to the patentee or his legal representatives an extension of the term of two years on his proving to the satisfaction of the Commissioner that his failure to commence or carry on such construction or manufacture is due to reasons beyond his control.

Term for importation may be extended. Proviso.

6. The Commissioner may grant to the patentee or his legal representatives, for the whole or any part of the patent, an extension for a further term not exceeding one year, beyond the twelve months limited by section 4 of this Act, during which he may import or cause to be imported into Canada the invention for which the patent is granted, if he or they show cause, satisfactory to the Commissioner, to warrant the granting of such extension: but no extension shall be granted unless application is made to the Commissioner at some time within three months before the expiry of the twelve months aforesaid.

Conditions which may be substituted for condition as to manufacture in Canada.

7. On the application of the applicant for a patent, previous to the issue thereof, or on the application within six months hereafter of the owner of any patent heretofore issued and now in force or by this Act revived, the Commissioner, having regard to the nature of the invention, may order that such patent, instead of being subject to the condition set forth in paragraph (a) of section 4 of this Act, shall be subject to the following conditions, that is to say:—

License to another to manufacture and sell, in case of negligence of patentee. Terms of license.

(a.) Any person, at any time while the patent continues in force, may apply to the Commissioner by petition for a license to make, construct, use and sell the patented invention, and the Commissioner shall, subject to general rules to be made for carrying out this section, hear the person applying and the owner of the patent, and if he is satisfied that the reasonable requirements of the public in reference to the invention have not been satisfied by reason of the neglect or refusal of the patentee or his legal representatives to make, construct, use or sell the invention, or to grant licenses to others on reasonable terms to make, construct, use or sell the same, may make an order under his hand and the seal of the Patent Office requiring the owner of the patent to grant a license to the person applying therefor, in such form, and upon such terms as to the duration of the license, the amount of the royalties, security for payment, and otherwise, as the Commissioner, having regard to the nature of the invention and the circumstances of the case, deems just;

Assessors.

(b.) The Commissioner may, if he thinks fit, and shall on the request of either of the parties to the proceedings, call in the aid of an assessor, specially qualified, and hear the case wholly or partially with his assistance;

More than one license may be granted.

(c.) The existence of one or more licenses shall not be a bar to an order by the Commissioner for, or to the granting of, a license on any application, under this section; and

Forfeiture of patent for refusal to grant license ordered by Commissioner.

(d.) The patent and all rights and privileges thereby granted shall cease and determine, and the patent shall be null and void, if the Commissioner makes an order requiring the owner of

the patent to grant any license, and the owner of the patent refuses or neglects to comply with such order within three calendar months next after a copy of it is addressed to him or to his duly authorized agent.

References to Exchequer Court. Jurisdiction of other courts.

8. Any question which arises as to whether a patent, or any interest therein, has or has not become void under the provisions of sections 4, 5, 6 and 7 of this Act, or any of them, may be adjudicated upon by the Exchequer Court of Canada, which court shall have jurisdiction to decide any such question upon information in the name of the Attorney General of Canada, or at the suit of any person interested; but this section shall not be held to take away or affect the jurisdiction which any court other than the Exchequer Court of Canada possesses.

Validity of certain extensions heretofore granted.

9. The validity of any extension heretofore granted or assumed to be granted under section 37 of the said Act, of the period of two years limited by that section, or by that section as heretofore amended, for the commencement of the construction or manufacture of a patented invention, or of the period of twelve months thereby limited for the importation of the patented invention, shall not be open to impeachment, nor shall the patent for any invention in respect of which any such extension has been granted be deemed to have lapsed or expired, because—

(a) such extension was so granted or assumed to be granted by the Deputy Commissioner of Patents, or, as Acting Deputy Commissioner of Patents, by a person performing the duties of Deputy Minister of Agriculture under the provisions of *The Civil Service Act* in that behalf, instead of by the Commissioner of Patents; or because

(b) in the case of the invention to which such extension relates, there had been granted or assumed to be granted a previous extension or previous extensions of the period of two years or the period of twelve months, as the case may be, so limited.

Conditional validity of certain patents heretofore granted.

10. The validity of any patent heretofore granted shall not be impeached, nor shall such patent be deemed to have lapsed or expired, by reason of the failure of the patentee to construct or manufacture the patented invention, provided the patentee within the period of two years from the date of the patent allowed for such construction or manufacture, or within an authorized extension of that period, became, and at all times thereafter continued to be, ready either to furnish the patented invention himself or to license the right of using it, on reasonable terms, to any person desiring to use it.

2. In the case of any patent the validity of which is protected from impeachment by subsection 1 of this section, or which by reason of the provisions of that subsection is to be deemed not to have lapsed or expired, it shall be incumbent upon the patentee, or his legal representatives either (a.) within six months from the date of the passing of this Act to commence, and after such commencement to continuously carry on in Canada, the construction or manufacture of the patented invention in such manner that any person desiring to use it may obtain it, or cause it to be made for him, at a reasonable price, at some manufactory or establishment for making or constructing it in Canada, or (b.) within such six months to apply for and thereupon obtain an order of the Commissioner under section 7 of this Act making the patent subject to the conditions set forth in that section; and upon his or their failure so to do, the patent and all the rights and privileges thereby granted shall cease and determine, and the patent shall be null and void.

Section 39 amended.

11. The section substituted for section 39 of the said Act by section 7 of chapter 24 of the statutes of 1892, is amended by striking out lines eighteen to twenty-three of the said section, both lines included, and substituting the following therefor: "On petition to re-issue a patent after surrender, in addition to the fees on the original patent which shall notwithstanding such surrender continue to be payable as aforesaid, for every unexpired year of the duration of the original patent the fee shall be \$4.

Section 47 amended.

12. Section 47 of the said Act is amended by adding after the words "caveats" in the second line thereof, the following words: "and except those filed in connection with applications for patents which are still pending."

Delay for granting certain extensions.

13. Notwithstanding anything in the said Act contained, in the case of any application to the Commissioner made within the time prescribed by the said Act or by this Act, and pending on the ninth day of April, one thousand nine hundred and three, or of any such application thereafter made within such time, for an extension of time to construct or manufacture a patented invention or to import it into Canada, the Commissioner may, until the first day of January, one thousand nine hundred and four, grant such extension after the time so prescribed, and any extension so granted shall have the same effect as if granted within the time so prescribed; and no patent, respecting which such application has been or is hereafter made according to the provisions of this section, shall be deemed at any time to have expired by reason of the failure of the patentee to construct or manufacture the patented invention before said mentioned date.

Rights of third persons saved.

14. In the case of any patent which has heretofore become void or the validity of which might heretofore have been impeached, and which is revived or protected from impeachment by any provision of this Act, or which by reason of any such provision is to be deemed not to have elapsed or expired, any person who has, between the time when such patent became void or when the ground for such impeachment arose, and the time of the passing of this Act, commenced to manufacture, use or sell in Canada the invention covered by such patent, may continue to manufacture, use or sell it in as full and ample a measure as if this Act had not been passed; and in case any person has contracted with the owner of the patent for the right to manufacture, use or sell such invention in Canada, such contract shall be deemed to have remained in full force and effect notwithstanding that the patent has become void as aforesaid, unless such person who has so contracted with such owner can show that in the meantime, by reason of or on the faith of such invalidity or lapsing he has materially altered his position with respect to such invention, and that the revival of such contract would cause him damage.

15. Whereas the models and specimens of compositions of matter and of ingredients thereof, filed in connection with applications for patents of invention are of no value after they have served their immediate purpose; and the cost of storing and preserving them is very considerable, therefore it is hereby enacted that the Commissioner may destroy, sell or otherwise dispose of such models or specimens in such manner as he deems best in the public interest, and that any money arising from the sale or disposal of such models or specimens shall be dealt with as is provided by law with respect to public moneys.

16. Nothing in this Act contained shall affect any rights acquired by the parties to a suit in any of His Majesty's Courts by the final judgment rendered therein.

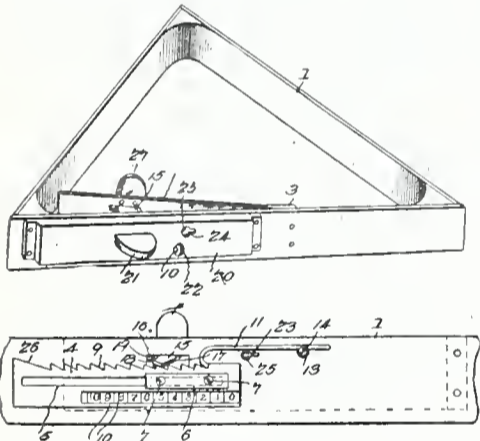
CLEVER NEW PATENTS.

Game-Register.—Combined Hammer and Wrench.—Check-Row Corn-Planter.

GAME-REGISTER.

Proprietors of pool-rooms will be interested in the game-register recently patented by Mr. Elmer J. Wells, of Nashua, Iowa, a one-half interest in the patent having been assigned to Mr. Gideon B. Wood, of the same place. This invention is designed to provide an improved device which is especially adapted for use in connection with the game of pool or similar games in which a plurality of balls or movable objects are set up or grouped by an inclosing frame at the beginning of each game, by providing such a frame with a registering device to register each time the balls are set up and to plainly indicate the number of games played. Moreover, it has for its object to provide for automatically actuating the register by the operation of setting up the balls.

To adequately illustrate the application and operation of the present invention, there has been illustrated in the accompanying cut, a triangular frame 1, such as is commonly employed in connection with a pool-table for setting up or bunting the balls at the beginning of each game.



In carrying out the invention there is provided a tongue 2, mounted upon the inner face of one side of the frame and formed by means of a metallic spring-plate, having one end fixedly secured to the frame, as at 3, and its opposite end portion bent or inclined outwardly from the frame, so that it may be forced backwardly against the adjacent side of the frame by the balls when the latter are being set up and for the purpose of actuating the register by the backward movement of the tongue. It will, of course, be understood that the tongue is comparatively thin, so as not to interfere with the proper setting up of the balls, and is also designed to spring outwardly when the frame is removed from the balls, so as to be in position for again actuating the register when the balls are again set up for another game.

The registering mechanism comprises a slidable plate 4, mounted upon the outer face of the same side of the frame to which the tongue is attached, and adapted to slide longitudinally in opposite directions thereon. A longitudinal slot 5 extends throughout the intermediate portion of the plate, and is for the reception of a guide-block 6, which is connected to the frame by suitable fasten-

ings 7, and has opposite longitudinal flanges 8, that overlap the outer side of the plate, and thereby slidably hold the latter to the frame. The upper edge of the plate is provided with a longitudinal series of ratchet-teeth 9, and a longitudinal series of numbers 10 is provided upon the lower portion of the outer face of the slidable plate, and progressing regularly from zero at the right hand to any predetermined number at the opposite end of the series.

For adjustably holding the slidable register-plate against accidental movement there is provided a ratchet device 11 in the form of a spring-dog arranged in operative relation with respect to the ratchet teeth of the slide. This dog is formed from a single length of spring-wire having one end bent into a catch-head for engagement with the ratchet-teeth and its opposite end bent into a lateral spur 12, which is driven into the frame, there being an intermediate loop or eye 13 for the reception of a fastening 14 set into the frame.

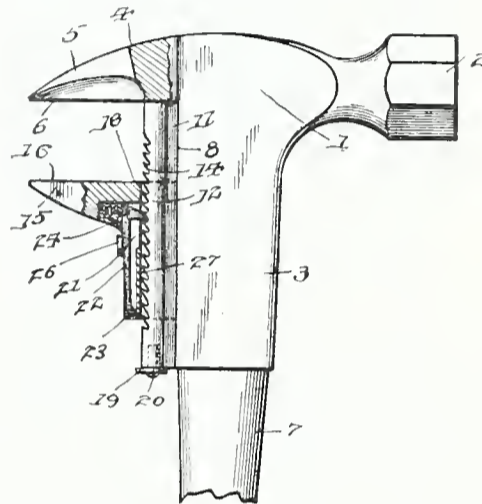
In order that the slidable number-plate may be actuated to slide longitudinally by the inward movement of the tongue 2, the latter is provided with a transverse finger 15, formed in the adjacent side of the frame, so that the finger may engage the ratchet-teeth of the slide, and thereby force the latter longitudinally one step at a time. The inner actuating edge of the finger is disposed at an angle to the teeth of the plate, so that in traveling across each tooth the latter is forced to yield to the finger whereby the slide is moved. Moreover, the finger is vertically elastic, so as to yield to the upward inclination of each tooth as the slide moves forwardly and also to snap downwardly after clearing the tooth when sprung outwardly from engagement therewith in order that the outer end of the finger may be in position to engage the lower-most portion of the next tooth. At the outer end of the finger there is provided a hook 18, disposed at the front or outer edge thereof and designed to engage a vertical stop-pin 19, extending across the slot or opening in the frame, whereby the tongue is prevented from springing too far away from the side of the frame.

COMBINED HAMMER AND WRENCH.

A combination tool in the form of a combined hammer and wrench that embodies considerable novelty has been devised by Mr. Charles Maggard, of Canton, Mo., and Mr. Charles A. Griffith, of the same place, has purchased a one-half interest in the patent obtained thereon. This invention relates to a combined hammer and wrench; and the object of the same is to provide a simple and effective device of this character wherein the claw of the hammer is arranged to serve as the fixed jaw of the wrench and in juxtaposition to a movable jaw having a particular arrangement and securing device, the combined device being adapted for use as a hammer alone without requiring a disassociation of the wrench attachment or the wrench feature applicable for service as such, without impairing the hammer characteristics of the implement.

The numeral 1 designates a hammer-head provided with the usual nail contacting projection 2 and also having an elongated socket 3 and a claw 4, with the nail-slot 5, the said claw having its inner face straight, as at 6, and in a plane at right angles to the socket 3 to serve in the capacity of a

fixed wrench-jaw as well as a nail-claw. The socket 3 receives the usual handle 7, and the end 8 thereof adjacent the claw 4 has oppositely-disposed vertically-straight faces, separated by an intermediate outstanding web or neck, provided with oppositely beveled sides, converging toward a vertical guide-rib 12, supported by the said neck or web, the guide-rib having inner curved bearing-surfaces and outer upwardly-directed teeth 14 extending over a portion of its length. Movably mounted on the guide-rib 12 is an adjustable jaw 15, provided with a shank 17, having a groove corresponding in contour to the shape of the opposite beveled sides of the neck or web and the curved bearing-surfaces of the said rib, the portion of the said groove in which the rib itself is lo-



cated being larger than the rib, so as to provide for the free adjustment of the jaw 15 and the operation of a locking device, which will be presently set forth. The jaw is adapted to be freely adjusted lengthwise of the rib 12, and the separated members at the inner end thereof produced by the formation of the groove 18 have a movable yet snug bracing engagement with the faces 9 of the socket 3, and this arrangement, in conjunction with the substantial dovetail association between the jaw 15 and the neck or web and rib, obviates any tendency toward a too-loose engagement of the jaw with the socket 3, and also produces a strong mode of supporting the said jaw. The jaw 15 is prevented from sliding off the lower extremity of the rib 12 by a stop washer or disk 19, which is applied against the lower end of the said rib and held in place by a screw 20, and by this means also the said jaw 15 can be disconnected from the hammer at any time desired and said hammer used alone to serve its usual function.

CHECK-ROW CORN-PLANTER.

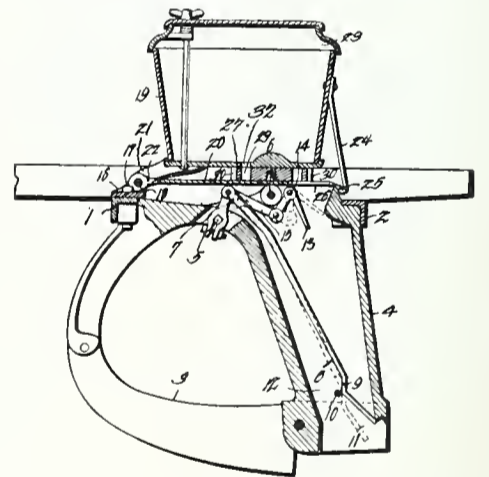
An ingenious check row planter has recently been patented by Mr. Peter E. Wistrand, of Galva, Illinois. Inasmuch as the invention relates to detailed parts of the machine only, only such portion of the frame of said machine necessary to support the parts constituting the invention have been shown.

1 designates the front or runner frame bar, and 2 a frame-bar parallel to the same, the two serving to support the seed-tubes and runners, which are bolted to the said frame-bars.

3 designates the runner or furrow-opener, and 4 the seed-tube, which is in the main of ordinary construction.

5 is the rock-shaft, which extends transversely across the machine and which is actuated in the usual manner by the checking mechanism; and 6 is a shaft having its bearings in the seed-tubes of the runner-frame and extending transversely across the machine in rear of the rock-shaft 5, from which motion is transmitted to it in the manner to be hereinafter described.

The rock-shaft 5 is provided with a crank 7, extending into the seed-tube and having its end pivotally connected with the upper end of the lower seed-valve 8. The latter extends downwardly into the seed-tube nearly to the lower or discharge end of the latter, and is provided at its lower end with an angular or V-shaped portion, the upper part of which, 9, rests upon a pin 10, extending transversely through the seed-tube, while the lower part 11 of said V-shaped portion is adapted to engage or bear against the rear side or wall of the seed-tube, thus closing the outlet of the latter. It will be observed that the pin 10 holds the valve 8 from contact with the front wall of the seed-tube, leaving an open or empty space which serves to prevent dirt and other obstructions from clogging the lower end of the seed-tube and interfering with the successful operation of the device. The V-shaped portion at the lower end of the valve 8 serves to support the seed-kernels until, by the operation of the valve, they are dropped or discharged at the lower end of the seed-tube.



The upper seed-valve 13, which is mounted upon a pin or shaft 14 in the upper end of the seed-tube, near the front wall of the latter, is connected pivotally with one end of a link 15, which extends rearward, and the other end of which has pivotal connection with the crank 7, mounted upon the rock-shaft 5. It will thus be seen that when the latter is actuated by its operating mechanism, the valves 8 and 13 are simultaneously operated thereby, with the result that when the valve 8 is moved downwardly to discharge the seed-kernels supported by it, the valve 13 is moved in a rearward direction, so as to close the outlet and to receive the seed-kernels conveyed thereto from the seedbox. When, on the other hand, the valve 8 is raised to its closed position, the upper valve 13 is thrown open, thus permitting the seed-kernels supported thereby to drop from the seed-tube and onto the lower valve.

TYPEWRITING BY WIRELESS TELEGRAPHY.

A wireless telegraph typewriter, or zerograph, as it is called for the sake of brevity, has been invented by an Englishman. The zerograph in appearance resembles an ordinary typewriter, but it is of simpler construction, with a keyboard figured with the signs of the letters and numerals, which can be printed or telegraphed to any number of instruments. Each instrument, the inventor explains, is at once a receiver and a transmitter, enabling operators to converse with one another in writing, and thus obviating misunderstandings, which are apt to occur in telephonic communications. So far, messages have been sent only for a short distance, but it is intended to experiment over wider spaces, and it is hoped that messages can be sent to any distance that ether waves will carry. The machine is always ready for immediate use, and as there is no mechanism which requires to be wound up in order to obtain synchronism, the operator has both hands free for manipulation.

tion was going on over the same wires. I have sent messages also between Berlin and Frankfort."

The illustration shows a typewriter (1) which by depressing a key sends two impulses to line. Each letter only requires two impulses and the different letters are obtained by means of the time interval between these impulses. For wireless purposes these impulses operate a switch (2), connected with the induction coil (3), thus making the sparks for sending the ether waves. The induction coil is connected with an aerial as well as an earth wire. To turn the apparatus into a receiving instrument, it is only necessary to move a switch which is placed beneath the typewriter. This makes all the connections to the receiving apparatus, which consists of a coherer and a very sensitive relay (4).

The advantages claimed for this system are numerous.

First, the speed of transmission is much greater than the ordinary Morse, as there are only two waves trans-

responding to waves sent most rapidly in succession.

This apparatus would seem to be of special use to people residing out of town, while for business purposes it will find valuable application. It is said that the zerograph has been tried on long wires and on short wires, on copper wires and on steel wires, and on one composed of lengths of iron, phosphor bronze, and the remainder underground. So far, however, the expense of the instruments will prevent their widespread use, inasmuch as the cost of a single pair is said to be over \$1200.

Economy in Wasteful Steam Engines.

There are some lines of manufacture where the principal use of steam is for heating rather than for developing power in an engine, although engines of considerable power are needed. Now, as is well known, the total heat of exhaust steam is but little less than that of the live steam from the boiler before admission to the engine, so that for heating purposes it is just as useful. This idea has been utilized by taking the exhaust steam from the engines instead of live steam from the boilers for the heating necessary about the works. In many cases the amount of steam necessary to produce the heating effect is considerably greater than would be supplied by the exhaust of a very economical engine, so that in such cases it is decidedly better engineering to use a cheap and wasteful engine, as far as steam economy is concerned, rather than an expensive and economical one. Speaking roughly, the power of the engine is obtained for nothing, so that this really does not enter as a factor at all, and consequently the cheapest engine which will do the work is the best one to use.

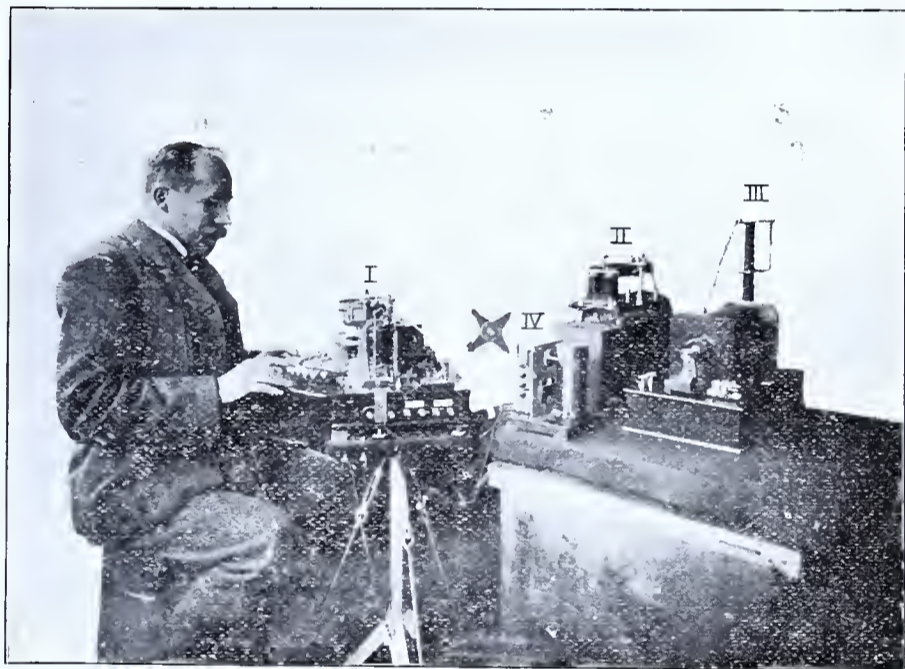
There are cases also where steam is used direct from the boilers for heating purposes and where the question comes up whether to use a cheap boiler which will make wet steam or a highly efficient boiler which will make very dry steam. In ordinary work, for use with an engine, the latter is, of course, the one to be chosen; but where all the steam is to be used for heating, the cheap boiler that makes wet steam is the better.—*Cassier's Magazine*

A New Pulley Covering.

A pulley-covering has been devised and patented by Jean F. Webb, of Denver, Colo., the invention being designed to be applied to the rims or perimeters of pulleys to prevent slippage of belts thereon and to increase the traction thereof.

A band of single-ply material such as leather or rawhide is employed, one end of which is reduced in thickness to form an inner tongue that extends from a shoulder to the termination of the end of the band by which it is carried. The other end of the band is split to divide it into an inner tongue of a thickness approximately that of the first-mentioned tongue, and an outer tongue that is of greater length than the inner tongue, so that it will overlap both of the inner tongues when they are brought into abutting position against the rim-face of the pulley. When the covering-band is applied to a pulley, the inner tongues occupy positions in which their edges face or abut each other, and they are secured together by a strip of lacing, threaded through perforations therein or by any other suitable means. The outer tongue is then cemented or otherwise fastened on to the inner tongues to enclose them and present a smooth surface across the joint at the ends of the band, the outer end being preferably of sufficient length to extend to the shoulder at the junction of the inner tongue, with the end of the band by which it is carried. When the band has been made and applied to the pulley in the manner described, it fits tightly to the pulley-rim and is perfectly smooth and even throughout its circumference, without the presence of any jutting fastenings at the joined ends of the band, and therefore when the belt is applied to the pulley it will run as smoothly on the band as it would upon the surface of the pulley-rim and without the occurrence of slippage, which so frequently happens on the rims of pulleys, especially after they become worn smooth.

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Another advantage claimed for the invention will be of especial importance in military affairs. Messages cannot be picked up. To quote the inventor's own words: "In sending a message, you are sending two ether waves which allow you a choice of 56 signs, and these are given direct print, either as letters or figures. Absolute secrecy is thus obtained. The only way to intercept messages would be to employ a similar instrument, which would have to be synchronized to the same degree as the transmitting instrument. Lastly, these machines will receive their messages (which are given at present at a speed of 25 words a minute) without anybody being present, and would thus be of great advantage in a signal box, as the signal man will receive clearly printed instructions should he be absent at the time that the message is sent to him. Nor will the machines work only without wires. I gave a lecture in Paris before the Society of Civil Engineers, of which I am a member, during which I sent messages to Brussels, while telephonic communica-

mitted for each signal out of 56. Secondly, these waves only consist of dots, and no dashes are employed as in the Morse. Thirdly, the signals transmitted can only be deciphered by the one for whom they are intended. Fourthly, no one need be in attendance when receiving as there is no clock-work or auxiliary apparatus which requires attending to. Fifthly, the operation is so simple that with only a few hours practice, a message can be sent by even a child, so that a skilled operator is not required; and it is therefore most applicable for lightships and other positions where skilled operators are not always at hand.

It is especially suitable for military and naval purposes in time of war, as the enemy cannot decipher the messages. The apparatus is absolutely reliable, as the messages are given indirect print, thus excluding the errors so frequently made with the Morse code.

The coherer is of an absolutely original design, and is of a self-cohering nature. It is capable of

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MECHANICAL INVENTIONS AND DESIGNS

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William J. Weaver and Casper F. Hoffman, Reynoldsville, Pa. Device for Moistening Adhesive Surfaces.—The object of this invention is to improve moistening devices by reducing the evaporation to a minimum, and at the same time afford convenient access to the water when it is desired to use the device. The water is contained within a receptacle, provided at the top with a flaring neck forming a cup, and having a bottom opening which communicates with the interior of the receptacle. An inverted elastic cup, which is provided with a tubular stem, is arranged within the receptacle on the bottom thereof. The tube projects slightly into the flaring neck of the receptacle, being yieldably supported by the inverted elastic cup and adapted to be depressed to force the water upward through it. A moistening device, which is adapted to be placed on the end of the finger, is used in connection with the receptacle.

Mary S. Churchill, inventor: Mt. Vernon, Ills. Clothes Rack.—This novel and ingenious clothes rack, which is compactly folded when not in use, is capable of being arranged in a great variety of positions to enable it to be disposed most advantageously in any available space. It is adapted either to surround a stove or fit in a corner, and when folded, it can be conveniently carried. The clothes rack is provided with intermediate and end sections hinged together, the intermediate sections being arranged in pairs and adapted to space the end sections, when the parts are folded, whereby convenient handles are formed at one end of the rack for carrying it.

Chauncey B. Corl, Ashtabula, Ohio. Horse Controlling Device.—This device is operated from one of the wheels of a vehicle and exerts a strain upon the animal's head should it attempt to move forward, and automatically relieves it of the strain when the vehicle is backed. The vehicle wheel is provided with a gear, and the device, which is hinged to the axle, carries a pinion to mesh with the said gear. The pinion is fixed to a shaft, which is provided with a drum, and a strap, which is connected with the bit of the animal, is arranged to be drawn backward around the drum when the vehicle moves forward. The pinion is normally held out of mesh with the gear by a spring bracket, and when it is desired to arrange the device for controlling the animal, the pinion is moved into mesh with the gear and is held in such cooperative relation by a locking lever. As soon as the locking lever is swung to its releasing position, the spring bracket automatically carries the pinion out of mesh with the gear.

Thomas S. Tilley, Newport, R. I., inventor; William J. Thomas, assignee, same place. Measuring Instrument.—More particularly, the invention relates to combined plumb levels and inclinometers, the object being to provide a simple instrument by means of which the angle of inclination of a surface or plane may be readily ascertained, this instrument being also capable of use as an ordinary level. A main body block is employed having a central opening therethrough in which is pivoted an indicator. The indicator is supported in a novelly formed frame having a scale coacting therewith. To one edge of the body is pivoted a base plate

and toggle levers connect the same with an intermediate portion of the body. The toggle levers are foldable together to permit of the base plate being arranged flat against the body, so that the device can be used as an ordinary level, or, if desired, supported at an inclination.

Thomas S. Tilley, Newport, R. I., inventor; James Oscar Peckham, Middletown, R. I., assignee. Combined Level and Inclinometer.—In his second patent the inventor discloses an exceedingly advantageous arrangement of parts which are located wholly within the contour of the level bar to permit the sections of the latter to present smooth exterior faces for enabling the instrument to be arranged contiguous to the work to be measured. The level bar is composed of two similar skeleton frames or sections hinged together at one end and connected adjacent thereto by an arcuate bar or brace, fixed to one of the sections and engaged by a set screw of the other section. The sections are provided between their ends with opposite recesses forming an opening for the reception of the inclinometer. An interiorly arranged locking device secures the sections together when the instrument is closed.

Ritchard P. Charles and Charles C. Detherage, Bristol, Tenn. Hand-Operated Machine.—The subject matter of the present patent is an implement that may be employed as a wrench, a drill, or other similar use. A handle is provided having at one end a ring within which is rotatably mounted a head having ratchet teeth on its periphery. These teeth are operated upon by a reversible dog mounted upon the handle. The head has a central opening, and is pivoted on opposite sides of the opening are jaws that are adapted to swing across the same to engage the nut or other article, and are normally urged outwardly by suitable springs. The jaws, however, may be forced inwardly by wedges located behind the same and slidably mounted on the head, these webs being operable by means of thumb-screws having exposed ends and constituting clamps for holding the wedges against movement.

George A. Getty and Louie H. Lemley, Waterbury, Conn. Lace Tip. Every one has experienced the inconvenience of insecurely fastened lace tips which easily slip off to the great annoyance of the wearer, on account of the difficulty of threading the lace without its tip. In order to obviate this objection, the above inventors have provided tips which can be applied to or detached from laces or shoe strings without trouble. The article consists simply of two semi-cylindrical sections hinged together and having their free edges arranged to interlock. These sections each carry an inwardly extending prong. This device can therefore be snapped over the end of a lace and the prongs engaging in the same will prevent its detachment.

Herman H. Brandes, Corydon, Ky. Combined Cane and Whip.—There is no question but that a nice flexible buggy whip that can be converted into a handsome walking cane when the owner attends a fair, picnic, church, or other public gathering, is something that will fill a want and can be sold, if the style and price is right. Mr. Brandes' invention is believed to exactly fill the bill, as it makes not only a fine looking flexible whip, but may be changed into a practical up-to-date cane. The cane proper consists of two pieces of light steel tubing, and this is the most expensive part of the entire structure. Within the tubing can be housed the whip portion of the device, and the handle is common to both features. The whole is ornamental, neat, durable, and cheap, and if properly placed before

the public will undoubtedly become a paying investment. The patent is for sale and any one who is in earnest and desires further particulars should write to Mr. Brandes at the above address. In this connection it may be stated that he does not belong to that class of inventors, who, because they have obtained a patent, hold the same at an impossible figure and practically desire the earth.

George W. Toler, Havana, Ark. Cultivator.—It is the aim of this invention to provide a cultivator adapted to remove weeds, grass, etc., and to supply clean earth to the furrow in a divided or pulverized condition to prevent baking. The cultivator is provided at each side with a set of disks, capable of vertical and lateral adjustment. A scraper is arranged in advance of the disks, and a roller, adapted to press down the loose soil, is located in rear of the disks.

George S. Ingle, deceased, formerly of Terre Haute, Indiana; Howard Wells, administrator, Evansville, Indiana. Mr. Ingle, who was an expert in the coal business patented a number of important improvements in coal-handling machinery. One of the earliest of these is a screen so constructed that there is practically no vibration and moreover no necessity for hangers or upper supports. To this end a supporting frame is employed which included upwardly inclined short tracks, these tracks being curved so that their upper ends are more sharply inclined than their lower portions. The screens are located one above the other and are carried upon wheels that run upon these tracks. The driving power consists of a suitable shaft having oppositely disposed cams, and links connect these cams respectively with the screens. As a result, when the structure is in operation, one screen substantially counterbalances the other and when one of the screens has reached its limit of movement upon the steeper inclines of the track, the other is upon the lower inclines. Thus upon the return, the upper screen will start down the steeper inclines and start the lower one without any shock or jar to the driving power and without creating vibration in the supporting means.

Two other of the inventions relate to driving cables. In the simpler form, a wire cable is employed having enlargements at suitable distances apart, which enlargements are arranged to coact with the teeth of the wheels above which the cable passes. These enlargements comprise sleeves fitted upon the cable and having heads located in their ends, which heads are provided with tapered mouths, to permit the bending of the cable. The spaces between the sleeves and the cable are filled with Babbitt or other metal which thus holds the same securely against relative movement.

The third patent is along the same lines, but covers a modified construction in that two cables are employed that are connected at suitable distances by blocks secured in the same manner. Between the blocks are disposed similarly constructed sleeves that prevent the wearing of the cables. At intervals, the blocks are provided with stems adapted to engage the mine cars and thus propel the same. The blocks carrying the stem are guided by outstanding fingers running in guideways alongside the cable. Suitable means connect the terminals of the cables so that the proper tension may be placed thereupon.

Levi T. Stephenson, Denver, Colo., inventor; Richard J. Williams, Trinidad, Colorado, assignee. Gas Generator. Mr. Stephenson has recently obtained a patent for an acetylene gas generator involving a construction which insures absolute safety in the operation of this usually dangerous type of generating apparatus. Within a receptacle comprising inner and outer walls a series of carbid holders

are retained by an axial pipe through which water is supplied to the bottom of the receptacle from a suitable reservoir. The water first flows into the bottom of the seal chamber defined between the inner and outer walls and forms a seal for the cover. As the level of the water rises after forming the seal the carbid charges are successively attacked and decomposed to liberate the acetylene gas which is stored in a well as usual. By this arrangement it is impossible to generate gas before the cover is properly sealed and the usual necessity for inspecting the seal before starting up the apparatus is avoided. An automatically operated safety valve for preventing an excessive pressure and an automatic water feed are also provided.

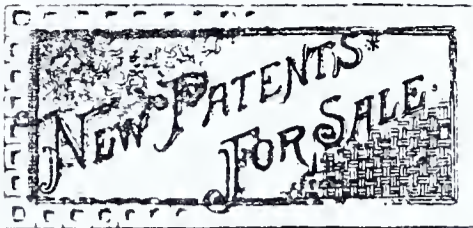
Levi T. Stephenson, Denver, Colo. Nut Lock. Two patents have been obtained by this inventor in this art. In the first, the bolt has the main portion of its shank at one end threaded, and is provided with a reduced terminal that is threaded in an opposite direction. Two nuts are screwed upon these oppositely threaded portions, one being provided with a series of sockets in its outer face that is adapted to receive projections located on the inner face of the coacting nut. Beneath the inner nut is arranged a washer comprising a pair of rings, one of which is split into two sections, the sections being secured to the other ring. James P. Dunlavy and William P. Dunlavy, of Trinidad, Colorado, own interests in this patent.

The other patent covers a more simple device. A washer is employed that is adapted to be placed beneath an ordinary nut, this washer comprising a flat sheet metal plate, and having one edge bent downwardly and overhanging the main portion forming a hood. This hood has its central portion cut away to permit the free rotation of the nut therethrough. Within the hood is secured a spring-holding tongue that extends across the cut-away portion, and while permitting the movement of the nut in one direction will prevent its retrograde movement unless held down by a suitable wedge. Ola M. Jorndt and Effie L. Stephenson, of Kansas City, Kansas, and Coral L. Jorndt, of San Francisco, California, own part interests in this second patent.

Levi T. Stephenson, Denver, Colo., inventor; Charles S. Bancroft, and William P. Dunlavy, Trinidad, Colo., assignees. Rail Joints. Two patents. These patents cover practical improvements in devices for coupling the ends of rails together, and for locking the nuts and the bolts to prevent them from jarring loose through the vibration of the rails.

One of the inventions is composed of two fish plates provided at their bottoms with inwardly extending chair members located beneath and supporting the ends of the rails. Before the usual bolts are passed through the fish plates and the web of the rails, smooth headed pins are inserted in openings or ledges of the fish plates. These pins extend through the bottom flanges of the rails and engage the upper chair member, whereby they not only serve as means for preventing the nuts from unscrewing, but also operate to lock the parts of the rail joint together.

The other invention comprises a pair of fish plates having converging upper portions for engaging under the heads of the rails, and provided with inwardly extending bottom portions, which receive the rails and which are provided with means for engaging the cross ties. The inwardly extending rail supporting portions are provided at their lower faces with grooves for the reception of the locking devices, which engage the heads and nuts of the bolts. These locking devices connect the fish plates and have vertical portions which pierce the same at points beyond the rails.



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FOR SALE—Patent No. 742,660, dated Nov. 10, 1903, Mail box for use in rural free delivery. Approved by Postmaster General. Address, Elmer E. Reese, Rolling Prairie, Indiana. feb

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FOR SALE—Patent No. 734,032, dated July 21, 1903 Switch Stand Address, A. B. Bulloch, Edwardsville, Alabama. feb

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WASHINGTON, JANUARY, 1904.

A New Patent Office Building.

In June 1902, the AGE called attention to the bill introduced by Senator Daniel, of Virginia, providing for a new Patent Office and Hall of Inventions, the plan being to place such a structure on a site east of the Capitol, and north of the Library of Congress. The proposition is now being revived.

There will be no dissent from the statement that the Patent Office, in common with other government bureaus, is inadequately and even unsafely housed. The records of the Patent Office are undoubtedly among the most valuable of all the government archives. Their files contain the original official memoranda of patents, and on them depend proprietary interests ranging far into the millions of dollars. The total destruction of the Patent Office files would precipitate endless litigation, and throw many great business interests into inextricable confusion.

Apart, however, from the danger of fire, the huddled condition of the Patent Office is not only undignified but confusing. This important branch of the government should be provided with ample room in a building designed especially for its use.

The proposition of Senator Daniel seems to fully meet the wants of inventors, and it is therefore urged that inventors and their friends should write to their Congressmen, requesting support for the bill introduced by Senator Daniel. Only by a determined effort on the part of those most vitally concerned, can any progress be made. As everyone familiar with the facts know, it took nearly a generation for Congress to erect a new Library of Congress, notwithstanding the fact that the demand for it was urgent. By repeated appeals, it is believed that success will finally crown the efforts of those who are desirous of having erected in Washington a Hall of Inventions as well as a Patent Office building, in which the vast interests of inventors and manufacturers may be properly looked after.

Important Changes in Canadian Patent Law.

On the thirteenth day of August, 1903, an Act was passed by the Senate and House of Commons of Canada, amending the patent laws of that country. The matter is of so much importance, that we have printed in another section of the paper, a copy of the amendment.

Briefly, the new law makes the term of Canadian patents heretofore granted, or to be granted, entirely independent of corresponding foreign patents; it allows the placing of *certain* patents under the compulsory license system in lieu of the manufacture of the patented article; it permits the revival of certain patents which were not "worked" as required by the old law; it empowers the Commissioner to grant a *single* extension of the two years term within which a patentee is required to construct or manufacture his invention in Canada, upon proof to his satisfaction, that the failure to commence or carry on the construction was due to reasons beyond the patentee's control; and it empowers the Commissioner to grant an extension of the one year term allowed for the importation into Canada of the patented article manufactured outside of that country.

By making the term of Canadian patents independent of corresponding foreign patents, it is possible to obtain a Canadian patent for the full term of eighteen years, notwithstanding the prior issuance of a United States patent for the term of seventeen years. Under the old statute, if a United States patent was issued first, the Canadian patent would only run for seventeen years, the term of the United States patent. Now, the Canadian patent will have a term of eighteen years, provided the extension fees are paid, no matter if the invention has been previously patented in the United States.

As is well known, an inventor who takes out a patent in Canada, is allowed one year after the date of the Canadian patent in which to import into Canada samples of the patented invention made outside of that country. After one year has expired, the patentee residing in another country cannot continue to import the invention to Canada unless he procures an extension of the importation period. It has been found that such extensions are granted without much difficulty, though in each case, the reasons alleged must be supported by an oath, declaration, or affidavit made by the patentee.

It is also well understood, that within two years from the date of the Canadian patent, the invention must be actually manufactured in Canada. Herein arises a great hardship, particularly to United States patentees. Formerly, the Commissioner of Patents granted extensions of the manufacturing period upon the slightest showing; but by a decision of the Supreme Court of Canada, in the case of *Power vs. Griffin*, this has been changed, and now it is almost impossible to obtain an extension of the two year term allowed by law. Indeed, we are in-

formed, that out of twenty-five hundred applications for such extensions, filed within the last few months, three only were granted. It became necessary to provide some remedy for the situation. Therefore, the amended statute permits the Commissioner of Patents, having regard to the nature of the invention, to order that the patent, instead of being subject to the manufacturing provision of the law, may be subject to the compulsory license requirements of the amended statute. This may be done by all owners of Canadian patents, who have not worked the invention in Canada within two years, provided the application is made before February 13, 1904, and may also be done by any owner of a Canadian patent which may be issued in the future, should such application be made within six months from the date of issuance of the Canadian patent. That is to say, a Canadian patentee may elect any time within six months from the date of his Canadian patent, whether or not he will take his chances of having the invention manufactured in Canada within two years, or if he will permit his patent to be subject to license by any Canadian manufacturer who may apply to the Commissioner of patents for such a license.

The amended statute prescribes that any person may petition to the Commissioner of Patents for a license to make, construct, use, and sell the invention covered by any patent, and the Commissioner shall hear the person applying for the license as well as the owner of the patent, and if he is satisfied that the reasonable requirements of the public, in reference to the invention patented, have not been satisfied by reason of the neglect or refusal of the patentee to make, use, or sell the invention in Canada, the Commissioner may make an order requiring the owner of the patent to grant a license to the person applying therefor, in such form, and upon such terms as to the duration of the license, the amount of royalties and security for payment, as the Commissioner may deem just.

To carry this provision into effect, the Commissioner may call in the aid of an assessor especially qualified to determine the amount of royalty. The license to such party will not be exclusive, and other licenses may be granted under the same patent. Of course, if the patentee refuses to grant the license, after the order has been issued by the Commissioner of Patents, the patent may be declared null and void.

By making the patent subject to the compulsory license provisions of the new statute, it does not prevent the patentee from manufacturing the invention in Canada on his own account, or licensing other Canadian manufacturers to make, use, and sell the invention. Indeed, a compulsory license may not be sought by anyone during the term of the Canadian patent, but by making the patent subject to such provisions, the patentee forfeits his exclusive right to control the manufacture of the invention, and anyone during the term of the Canadian patent, may apply to the Commissioner as hereinbefore explained, and obtain a license upon making the proper showing.

Formerly, and even now, if an extension of the manufacturing period is

not applied for or granted, the Canadian patent would be rendered voidable. Now, if the patentee fails to manufacture the invention within two years in Canada, and fails to secure an extension of the manufacturing period, and fails to make his patent subject to the compulsory license requirements, the patent is practically null and void at the end of two years, even though the fee for the partial term of six years is paid. Therefore, it is recommended to all Canadian patentees, unless they are able to make permanent connections with a Canadian manufacturer so that their inventions may be manufactured continuously in Canada for the full term of the patent, that they should take advantage of the provisions of the new law, and have their patents made subject to section 7 of the Amended Patent Act.

In view of the fact that the new law revived all patents in which the extensions of the manufacturing period had not been obtained, it follows that all holders or owners of Canadian patents may apply, up to February 13, 1904, to have their patents made subject to the provisions of section 7 of the Act of August 13, 1903.

THE PATENT OFFICE.

Its Increased Business During the Past Year.

With the close of the last official issue of patents granted during the year 1903, the United States Patent Office has again broken the record. The year has shown a wonderful increase in everything that relates to the granting of patents to protect inventions, including designs; also in the registration of trademarks. The growth of the business during the first twenty-five years of the existence of the Patent Office was considered wonderful; but such growth was nothing, compared with the increase made during the past ten years. The number of patents granted by the United States Patent Office reaches over 700,000. The number granted in the year 1902 was 27,136, an increase of more than two thousand over the previous year. This was the highest number ever issued by the United States Patent Office, and was considered remarkable. Each week's issue during 1903 has been a banner issue, with the result that there have been almost four thousand more patents issued during 1903 over the previous year.

The issue of patents for 1903 was 31,689: trademarks registered 2,186, an increase of 185 over last year; labels 990, an increase of 223 over the year previous, prints 270, an increase of 212 over 1902.

With the opening of the year 1904, there is an indication that matters will go forward instead of backward, though the increase may not be as much as it was during the past year.

Notwithstanding the increase in the number of patents issued, there has not been a corresponding increase in the force, with the result that work is not in as satisfactory condition as it should be. While Congress granted an addition to the force of examiners about a year ago, the increased business of the Patent Office has more than kept pace with the additional force, so that the Patent Office finds itself today needing more help. Judging, however, from the experience of the past, it will be many years before Congress will grant a further increase, even though the justice of the demands of the Patent Office may be conceded.

SCIENTIFIC

PROGRESS.

A New Insulating Material.

A new insulating material has been patented by Mr. George T. Pratt, of Westbrook, Maine. The object of the invention is to produce a substance which will have a high degree of efficiency as an insulator, and which shall, at the same time, have the necessary tensile strength, hardness, and toughness and which shall be waterproof.

The foundation of the material is leather pulp formed into a suitable sheet by any well known means, the leather pulp having mixed with it a suitable strengthening fiber, such as sulfite wood-pulp. This sheet is lightly pressed when it is formed, so that after it has dried it will be as porous as possible, and it is then impregnated with the insulating substance, which is preferably waterproof, such as mineral wax, hardened with rosin and alum. After being impregnated with the insulating material, the sheet is subjected to a heavy pressure.

Coating Glass.

A new process for coating glass or fabrics has been devised by Mr. Henry Keppler, of Brooklyn, N. Y. In carrying out this process, a luminous powder is first mixed in medium bronze lacquer and applied evenly over the surface of the glass. This gives the surface a frosted appearance, and by reason of the illuminating properties of the composition thus formed, when applied to one-half of a light globe, acts as a reflector. The lacquer serves, of course, to form an adhesive base for the powder. The second step is to mercerize white rubber varnish and apply the same evenly over the first mixture, after the latter has been thoroughly dried. The third step is to dust this surface before drying with gold-bronze powder. The surface is then dried, and finally, the article thus coated is subjected to a copper-bath, after which it may be painted or enameled. When this process has been applied to an electric light or other globe, it will be apparent that the portion thus treated will be entirely opaque, and that the inner surface of said coating will act as a brilliant reflector.

Concrete Piles in Construction.

Ferro-concrete piles have just been used in the construction of law courts near Berlin, Germany. They have been largely employed when getting the foundations, which are placed in poor and treacherous ground, with a very unstable coefficient of resistance. After many trials, it was determined to adopt piles of triangular section with the corners cut off. They are composed of clean, hard river ballast and Portland cement of the best quality, in the proportion of one part of the latter to three of the former. Their length varies from 17 ft. to 26 ft. The protective framing consists of three iron rods tied at regular vertical distances by eye rods, spaced every 10 inches, having a diameter of a quarter of an inch, and set into the concrete with a blunt point at their lower end.

According to a German journal, the concrete slightly wet is carefully prepared in a pug mill, and deposited in vertical wooden moulds, in layers 8 inches in thickness, subsequently reduced by pressure to about half that amount. Before fixing the tie rods

and adding fresh supplies of beton, the surface of each preceding layer is roughened, so as to insure thorough mixture and incorporation of the whole mass. Thus manufactured, the pile is left to itself for a period varying from twelve to twenty-four hours. During the next seven or eight days it is watered constantly and abundantly. It is then taken out of the mould, and again watered for the next eight or ten days, and becomes sufficiently hardened and consolidated to be safely transported to the site of the works. The piles are allowed to remain in this condition until they are about a month old, when they are fit to be driven, which operation is effected by means of a steam pile-driver, with a ram weighing two and a half tons. To prevent the heads being damaged by the fall, which is 5 feet 6 inches, they are protected by a buffer, built up of sheets of lead, plates of iron, and timber packing, all held together by an iron ring. Special arrangements are made for guiding the piles in their descent.

Electric Heater.

An Electric Heater has recently been patented by John F. McElroy, of Albany, N. Y., who has assigned his entire interest in said patent to the Consolidated Car Heating Company, of Albany, N. Y.

In the embodiment, a porcelain core is employed having a spiral groove on its exterior in which is laid a spirally composed heating coil. In the core is a square hole or passage from end to end, located somewhat eccentrically, and through this hole is passed the square rod that holds in place end pieces, and also serves as a support or retaining device for the core and coil within the casing. Parallel to the square hole is a small round hole extended through the core, also eccentric thereto, and through this hole is passed a return wire leading from the left-hand end of the core where the winding is finished, back to the right-hand end where the winding is started. By this means both terminals of the winding are brought to the same end of the core, and may be there disposed for ready construction with the external circuit in any known manner.

Aluminum Alloy.

William Rubel, a German engineer, residing in Berlin, has patented in this country a novel alloy. It is well known that pure aluminum can only be fashioned with the greatest difficulty, owing to its extreme softness, so that the employment of this metal in industry has probably reached its limit. It is true that by the addition of copper, this softness may be removed, but an addition of six per cent of copper is sufficient to make the alloy thus formed so hard that it cracks like glass, so that, like pure aluminum itself, it cannot be used to any great extent in practice. Mixtures of aluminum with nickel and cobalt with the addition of cadmium are also known, in which the cadmium imparts to the alloy, which of itself is not brittle, increased ductility.

Now Mr. Rubel produces a novel alloy of aluminum, copper, and cadmium which combines the good properties of pure aluminum and of the copper-aluminum alloy, while it does not present the bad qualities of these substances. An alloy of this kind is formed, for example, when four parts of copper are melted together

with 2.5 parts of cadmium and 93.5 parts aluminum.

An aluminum copper-cadmium alloy in the above proportions furnishes (contrary to what is the case with the known aluminum-copper alloy) an entirely clean casting, which is not dull or colored, so that the subsequent treatment of the casting is considerably facilitated. The alloy, as already stated, is very tough and easy to work, and is therefore especially adapted for those articles which are first of all cast, and then submitted to a mechanical operation.

Manufacturing Steel.

Benjamin Talbot, of Leeds, England, and Paul Gredt, of Luxemburg, Germany, have assigned to the Continuous Metal Refining Co., of Philadelphia, Pa., a patent recently obtained by them on a process of manufacturing steel and ingot-iron.

In carrying out the invention, a charge of metal is first purified in a Bessemer converter or similar vessel, running off a portion of the charge, and adding to the remainder a further charge of impure metal, so as to secure a reaction between the metalloids carried by the added metal and the slag and purified metal which were in the converter, by which means the main portion of the silicon and a part of the carbon contained in the added metal are eliminated without oxidation by the blast being necessary, and then completing the purification in the usual way in the same vessel or another vessel different from it. When this charge has been purified, a portion of the same may be poured off, and the process of addition and purification by further charges of impure metal may be repeated. The reaction takes place most rapidly when the percentage of carbon in the purified metal is low. Thus, if there be less than about fifteen per cent of carbon in the blown metal, the reaction commences as soon as the impure metal is added. This is probably due to the fact that there is then in the metal a large amount of dissolved oxygen, and this with the oxides in the slag combines with the carbon contained in the impure added metal, forming carbonic acid. This carbonic acid may be burned to carbonic acid in the vessel itself, thereby generating great heat in the converter and hastening the purification. When the reaction has ceased, the vessel may be turned down and part of the slag poured off: or if the metalloids in the added metal have not been eliminated to the desired extent, the charge may be blown until the desired result is obtained. After removal of a part of the slag, the remainder may be enriched by the addition of oxides in order to hasten the oxidation of the metalloids in the impure metal to be added. When using a phosphoric metal, sufficient lime should be introduced, preferably prior to the introduction of the impure metal and after the reaction, which ensures upon the introduction of such impure metal, the further elimination of the phosphorus and the carbon is secured by blowing in the ordinary way.

The operation may be conducted so that a charge of impure metal is first purified by removing the bulk of the silicon, part of the carbon, and more or less of the phosphorus in a converter, a portion of the thus-purified charge poured off, the remainder of the phosphorus eliminated by lime and blowing, the slag produced in the operation removed, oxides added to the bath, a further charge of impure metal added, and the combined charge blown.

Hardening Steel.

Mr. Gottlieb Kolb, residing in Mannheim, Germany, has obtained a patent in this country on a composition for hardening steel consisting of colophony, copper vitriol, prussiate of potash, and linseed-oil.

By treating steel of whatever kind with this composition, a degree of toughness and hardness is imparted to it, such as has been hitherto unattainable: and this is a point of the greatest importance, more especially in the manufacture of tools. Inferior, cheap-quality steel receives the above-named characteristics alike with fine high-priced steel, so that the latter can be replaced by an inferior kind. Burned steel, if treated with the new composition, again attains its original hardness and toughness. Indeed, it possesses these qualities in a higher degree than at first, so that it need no longer be discarded as waste material. By means of the new composition, an ordinary drill can be rendered so hard that the thickest glass and the hardest metals can be readily drilled with it, without the tool being appreciably worn.

In preparing the new composition, the already mentioned ingredients are mingled to form a firm mass. The best proportions in general have been found to be seven hundred grams of colophony, one hundred grams of copper vitriol, three hundred grams of prussiate of potash and one hundred grams of linseed oil.

Experiments show that the agent principally active in producing the desired result is the copper vitriol, which should be contained in the mixture as nearly as possible in the proportion stated. The proportions of the other individual ingredients may be slightly varied among themselves according to the special circumstance of the case.

The Widening Use of the Small Gas Engine.

So much prominence has latterly been given to gas engines of large size that the motor of modest output, ranging, say, from 10 H. P. downward, has been completely overshadowed; and yet its use has been a steadily widening one, and this, too, in the face of electric motor competition which, at the outset, had by many been considered likely to be a crushing one. Available evidence points to the fact that in many places small steam engine and boiler combinations have been displaced by small gas and oil engines, the gas engines commanding favor even in localities with high-priced gas. In almost every instance the gas or oil engine has been found firmly established either by considerations of convenience, or of superior economy as compared with the small steam motor, or of both. In the marine field, for small pleasure boats, and even comparatively large ones, another outlet has been developed for motors of that type to a degree with which the steam launch engine has failed utterly to keep pace. Gasoline automobile engines are in a class by themselves, perhaps not rightly entitled to consideration here, though they, too, help materially to swell the volume of business in small motors of the internal combustion type.—*Cassier's Magazine*.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE. This keeps inventors and manufacturers posted in the art in which they are most interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy; twenty copies \$1.50.—Please give correct data in ordering.—Address,

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Cooling jacket.....W. R. Hamm
Coop for poultry. Folding.....W. H. Warner, Jr
Cordage machine.....J. P. Tolman
Corn shelling machines. Automatic corn feeder and regulator for.....C. Petersen
Corrugating press.....J. P. Sneddon
Cotton cleaner and feeder M. F. & J. H. Seward
Cotton gin brush.....T. Brantley
Cotton opener grid.....H. S. Houghton
Coupling.....W. Miles
Cradle.....J. Barta
Crate. Egg.....D. T. White et al
Crate for carboys, &c.....E. G. Howe
Crate or box. Collapsible.....J. O. Black
Cream separator.....H. H. Stussy
Creamer. Centrifugal.....O. Anderson
Creaming can.....C. S. Obetz
Cross head pins. Machine for turning.....C. A. Matheny
Cultivator.....G. W. Hamilton
Cultivator and cotton chopper. Combined.....F. Bandy
Current interrupter.....T. A. Houghton
Curtain fastener.....M. L. Thomas
Curtain fixture.....H. H. Forsyth
Cutting tool. Yielding.....L. W. Gates
Desk implement. Combination.....W. R. Owens
Desk. Office.....E. G. Widman et al
Dexter lining.....G. Lanzenderfer
Disinfectant vessel.....H. Pfleger
Display rack.....R. F. Hatch
Displaying lace curtains, rugs, embroideries, tapestries, &c. Frame for W. A. McDougall
Dobby.....W. Crutchlow
Dock. Ore.....E. C. Carter
Door.....J. P. Hull
Door closer and check.....J. Bardsley et al
Doubletree spring attachment.....A. Holritz
Drapery. Frame for attaching.....A. Brower
Draw bar.....J. M. Ames
Dress suit case.....M. Axman
Drying kiln.....L. C. Van Duzer
Drill and reamer. Combined.....J. E. Fuhrer
Drill coupling device. Screw.....C. Christiansen
Drip pan.....B. McCaughey
Driving mechanism.....G. H. Fry
Dust collector.....J. M. Schutz
Dust collector. reissue.....E. R. Draver
Dynamo governor.....T. S. Tague
Egg boiler and server.....L. A. & C. N. King
Eggs. Preserving.....J. W. Green
Electric conductor.....A. E. Lytle
Electric controller.....A. Sundh
Electric current regulator.....P. Kennedy
Electric heater.....J. F. McElroy
Electric light switch.....E. L. Etheridge
Electric machines. Suspension of dynamo.....J. F. McElroy
Electric motor control system.....A. C. Eastwood
Electric switch.....C. E. Felt
Electrical machine. Static.....T. Archer
Electrical receptacle.....P. H. Fieding
Electrical switch.....H. & R. Lomax et al
Electrically heated handle.....R. A. Fliess
Electricity in electric therapeutics and electric treatment.....L. Williams
Electromagnet.....D. L. Lindquist
Elevator and dump.....J. W. King
Elevator bin.....J. A. Jamieson
End gate fastener.....D. E. Leonard
Engine starting mechanism. Explosive.....C. N. Cook
Engine supporting frame. Pumping.....E. T. Adams
Engraving.....N. S. Amstutz
Eraser.....H. B. Tooker
Evaporator.....H. J. Lyman
Excavator.....E. J. Beard
Exercising machine.....F. H. Chlada
Explosive engine.....H. Sohnelein
Explosive engine.....R. Harris
Extension bit or drilling tool D. L. Luddington
Extension table.....A. M. Petersen
Fan. Automatic.....W. H. Vanfossen
Faucet.....A. R. Stone
Feed water purifying apparatus. Boiler.....T. Sault
Feeder. Boiler.....W. Herrington
Felly retainer.....C. Wagner et al
Fence machine. Wire.....W. N. Parrish
Fence post.....J. D. Paldi
Fence post.....J. W. Childress
Fifth wheel and king bolt. Ball bearing.....H. W. Gander
File and file case.....E. B. Jepson
Filter press.....A. James
Filtering apparatus.....W. Kathol
Fire alarm system.....A. J. Woodworth
Fire escape.....M. C. Johnston
Fire escape.....2 pats. F. Bielhen
Fish hook.....W. E. Koch
Fish hook attaching device.....C. A. Abbath
Fish hook. Weedless.....J. N. Miller

Fish or minnow trap.....E. B. Cahoon
Fishing hook or bait guide.....H. R. Stewart
Flash light apparatus for photographic purposes.....J. F. Guimaraes
Floral design frame. Folding.....P. Raysik
Fluid pressure mechanism.....J. P. Coleman
Fluid pressure regulator.....J. Hancock
Fluids. Electrical method of dispersing.....J. F. Cooley
Fly paper holder. Sticky.....A. Katzeke
Food products. Preparing.....J. P. Roche
Framometer.....C. W. Bones
Fuel economizer.....J. Milne
Fumigating candle.....E. Kimnach
Furnace.....E. C. Brice
Furnace attachment. Roasting.....D. D. & J. O. Bailey
Furnace for heating asphalt, &c. A. Montpet
Furrow opener. Disk.....W. Bills
Galvanic battery.....D. L. Winters
Gas burner.....J. Hutchinson
Gas engine.....C. W. Tremain
Gas generator. Acetylene.....C. A. Butler
Gas heater.....J. H. Brownlee
Gas heater or stove.....H. Maytrott
Gas or oil engine.....A. G. Melhuish
Gas producer.....J. R. George
Gate.....V. R. Davall
Glove.....C. Winkler
Glove.....F. H. Busby
Gull club.....W. Dann
Governor.....R. Harris
Governor. Centrifugal separator H. F. Hassler
Grain binder.....C. R. Straughn
Grain drill.....D. B. Saltsman
Grain drill.....G. M. Kingsbury
Grater. Rotary vegetable.....H. H. Lyon
Grinding mill.....J. Q. Adams
Gun firing device. Breech loading V. C. Tasker
Hame trace attachment. Adjustable.....E. Littmann
Hand strap.....U. McClintche
Handle fastening for traveling bags, cases, &c.....W. S. Maxwell
Harness box loop.....B. F. Shepherd
Harrow.....A. Broomfield
Harvester.....H. J. Case
Harvester. Corn.....D. Buus
Harvester. Cotton.....I. Jefferson
Harvesting machine.....J. H. Brammer
Hatchet, hammer, and nail extractor. Combined.....C. R. Saunders
Hay or stock rack.....F. Goodsell
Hay rake. Horse.....H. Lingelbach
Heating system.....A. D. Hill
Hinge. Barrel cover.....R. H. Fesperman
Hinge. Sofa bed.....T. G. Weyer
Hoot protector.....O. J. Obison
Horn. Collapsible.....L. de Vileau
Hose pipe coupling.....W. Nob et al
Hot air heater.....T. B. Jackson
Hot water and hot air furnace. Combined.....J. Ziegler
Hydrocarbon burner.....A. G. Porter
Ingot mold.....T. E. Rees
Insect destroyer.....J. F. Butz
Insect destroying device.....F. Huucker
In-step supporter.....L. Dulligan
Insulated joint.....G. A. Weber
Insulated rail joint.....G. A. Weber
Insulating handle connection.....J. H. Gault
Insulator.....F. M. Locke
Internal combustion engine.....G. Erikson
Intestinal skins. Apparatus for dressing.....C. F. A. Benterling
Jar opening or closing grip.....J. Koehler
Journal box guard.....W. F. Bossert
Label retainer for salve boxes, ointment boxes, &c.....C. A. Myers
Lace machine.....S. G. Lewis
Lacing. Temporary shoe.....L. J. Driscoll et al
Ladder and ironing board. Combination step.....J. W. Treen
Lamp attachment. Combination.....J. & G. C. W. Magruder
Lamp base. Incandescent electric.....J. E. Casey
Lamp chimney. Mica.....J. D. Warren
Lamp socket. Incandescent.....G. H. Proctor
Lamp. Vehicle.....C. L. Betts
Lantern. Signal.....2 pats. F. W. Dressel
Latch.....M. S. Thorud
Latch.....W. W. Daves
Latch.....O. F. Immell
Laundry marking machine.....T. L. Taylor
Lens for spectacles or the like.....C. O. Schneider
Letter opener.....H. C. Zenke
Level. Plumb.....W. Brad-haw
Lifting jack.....A. R. Bolin et al
Lifting jack.....T. Hampton
Lightening arrester.....C. E. Nicholas
Limb. Artificial.....J. F. Rowey
Limekiln.....S. W. Shoop
Limekiln door.....S. W. Shoop
Line holder.....J. H. Lee
Liquid meter.....O. R. Pfau
Liquid separator. Centrifugal.....G. Rennerfelt
Liquids by solvents. Extracting matter from.....L. C. Reese
Load retaining or releasing means for vehicles.....D. McLaughlin
Lock.....O. Katzenberger
Locking device for connecting tubular or other parts.....F. E. Stuart
Loom batten operating mechanism.....C. W. Widenstrom
Loom friction let off.....H. Taylor
Loom let off mechanism.....C. F. Roper
Loom picker motion.....H. L. Goodwin
Loom picker stick connection.....J. A. Bottomley
Loom steel harness motion.....C. H. Draper
Loom warp beam.....N. J. Martin
Loom warp stop motion.....C. F. Roper
Loom weft replenishing mechanism.....A. Smith et al
Lubricator.....F. X. May
Mail box attachment.....J. R. Clark
Mail chute closure.....J. W. Cutler
Marking or erasive material. Holder for.....E. P. Hafner
Massage appliance.....J. Cassidy
Matrix material.....G. J. Wildridge
Measure. Tailor's attitude.....E. Wakefield

Measuring device.....F. M. Steadman
Measuring device. Foot.....D. E. Herizler et al
Meat cutter.....C. F. Smith
Mercury and amalgam from ores. Machine for recovering.....T. H. Hicks
Metal bars or rods. Cooling bed M. A. Neeland
Metal transferring apparatus.....E. E. Slick
Metals and alloys. Reduction of.....F. J. Tooe
Milk or cream vat.....T. L. Valerius
Molding machine.....W. F. Prince
Motion. Machine for converting.....G. A. Walker
Motor.....T. Buchanan
Motor sparking plug. Explosion J. Geisslinger
Movement cure apparatus.....J. I. Lewin
Mucilage jar.....S. G. Reynolds
Musical instrument.....G. Rossi
Musical instrument. Mechanical P. Wuest, Jr
Nails. Producing toughened wire E. S. Morton
Object projector.....J. Menchen
On cup.....J. Chesbro
Oil engine. Kerosene.....W. W. Tuck et al
Ordnance sighting attachment.....T. Ghenea
Ore feeder feed regulator.....C. Z. Ellis
Oven. Oil burner.....H. G. Tucker
Overshoe.....A. E. Roberts
Package fastener.....J. E. Wright et al
Package wrap and receptacle.....R. R. Lawson
Pail spout. Removable.....C. P. Capron
Paper bag holder.....W. G. Haas
Paper bag machine.....2 pats. G. R. Ward
Paper cutter for roll holders.....R. T. Jones
Paper cutting machine.....W. H. Hansell
Pasteurizer.....A. Jensen
Pavement.....C. H. Sayre
Peat digging and excavating machine.....C. Schlickeyes
Pencil holder. Pocket.....E. F. Rogers
Penmanship practice. Training device for.....H. Forbush
Perforating and round cornering machine.....J. B. Allen
Permutation lock. 2 puts.....O. Smith
Petroleum. Desulfurizing sulfur bearing.....T. F. Colin
Photographic plate holder.....A. C. La May
Photographic shutter.....T. Brueck
Photographic shutter.....C. Bornmann
Piano plate.....C. A. Haddonff
Piling. Sheet metal.....H. Witkind
Pipes against bursting by freezing. Means for protecting water.....N. M. Hopkins
Planer. Fixed knife smoothing C. C. Stuart
Planer. Foot.....F. Heibek
Planter. Potato.....H. J. Springer
Planter. Seed.....S. M. Merrick
Plastering tool.....W. A. Warson
Plastic composition.....R. H. Boyd
Plow.....U. Griffin
Plow.....J. S. Felt
Plow.....G. S. Latta
Plow and planter. Combined lister.....J. Siemen
Pneumatic despatch system.....K. E. Stuart
Pneumatic despatch tube sender.....K. E. Stuart
Pocket battery.....W. Heym
Pocket book or file.....F. Mann
Post office lock box lock.....J. A. Durnbaugh
Powder. Face.....R. Bellart
Power translating device.....G. W. Marble
Preserving fruit.....D. F. Sherman
Printer's quoin.....W. H. Scovill
Printing machine.....W. T. Bailey
Printing machine.....A. R. Buynon
Printing Multicolor.....P. G. Frauenfelder
Printing presses. Doctor for regulating and controlling the feed of paper to F. W. Rolland, Jr
Printing surfaces for color printing. Making.....C. G. Suneigren
Protractor. Machinists's.....C. T. Franz
Pulverizer corrugated lining.....J. M. Schutz
Pump. Centrifugal.....E. G. Harris
Punch. Ticket.....H. Cottrell
Puzzle.....W. D. Taylor
Radiator. Gas.....T. E. McNeill
Radiator. Stovepipe.....B. Edgar
Rail joint.....J. Santee et al
Rail joint.....L. T. Stephenson
Rail joint.....2 pats. G. A. Weber
Rail joint.....J. G. Kutzner
Rail joint.....G. A. Weber
Rail support.....G. A. Weber et al
Rail tie. Metallic.....H. I. Jeffers
Railway brake. Electric.....J. S. Lockwood
Railway rail joint. Suspended.....G. H. J. Maas
Railway signal.....W. C. Bryant
Railway signal.....J. P. Coleman
Railway signal.....J. P. Cameron
Railway switch.....M. S. Pittman
Railway switch and track construction.....J. W. Koch
Railway track layer.....W. B. Michel
Railways. Underground conduit system for electric.....A. H. Angle
Rheostat.....W. A. Sherlock
Rice hulling machine.....R. W. Welch
Rock drill or rock drilling machine. Electrical.....A. H. Gibson
Rotary engine.....E. M. Sturgis
Rule.....T. G. Saxton et al
Ruling machine. Paper.....A. L. Barber
Sales recording device.....W. Reardon
Sash balance.....2 pats. W. Berry
Sash fastener.....E. W. Hasenpflug
Saw tool.....E. G. Smith
Scaffold.....C. B. Commons
Scaffold. Window.....C. B. Cable
Scene displaying apparatus. Automatic.....C. F. Meusing
Scraper. Wheeled.....J. M. Brooks
Screw cutting die.....M. R. Mobeck
Seal. Sheet metal.....F. W. Brooks
Sewing machine shuttle driving mechanism.....A. Spear
Sewing machine shuttle raceway attachment.....L. B. Goeres
Sharpener. Edged tool.....T. Davis
Ship ventilator.....C. A. Withers
Shoe creaser.....P. J. Myer
Shoe tying machine.....T. F. Hart
Shoe welting. Welt.....J. B. Hadaway
Show front or show case.....J. L. Crane
Signals. Means for controlling illuminated announcement and display.....R. E. Lippincott

Signal or other staff H. M. Nourse
 Silk floss holder F. C. Runge, Jr
 Sizing compound J. C. Evans
 Skirt former S. Stratton
 Skylight J. Degenhardt
 Smoke consuming apparatus W. C. Courts
 Smoke consumption or prevention
 H. L. Fulenwider et al
 Snap hook J. F. Ellsworth
 Soldering the covers or bottoms of tin boxes.
 Machine for H. Finne, Jr
 Sound reproducing and scene displaying ap-
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 Sound reproducing and stereopticon appar-
 atus Combined C. F. Mensing
 Spade handle O. S. Haukvik
 Speed indicator F. L. Ebelhore
 Spinal curvature. Device for correcting
 C. G. P. Blomqvist
 Spinning frame W. P. Wingate
 Spinning machines. Apparatus for doffing in
 cap A. H. Illingworth
 Spooler A. E. Rhoades
 Spraying device. Liquid G. Gord, Jeff
 Square T. Esbriornson
 Stacker. Hay J. C. McCormick
 Stacker. Straw H. Heineke
 Stair rod securing device R. H. Warren
 Stall. Horse G. B. Eppley
 Stamp affixer F. E. Beck
 Stamp. Time F. L. Schulz
 Starching machine W. J. Asher
 Stave bung hole F. X. Schleich
 Steam boiler W. Dobler
 Steam generator J. J. Bush
 Step joint 2 pats. G. A. Weber
 Step. Sectional plastic J. Walsh
 Sterilizer S. E. Morse
 Stoker. Automatic N. E. Shontz
 Stop mechanism C. Wais
 Stovepipe fastener W. G. Drake
 Stovepipe joint H. E. Moomaw
 Strainer G. Lafrentz
 Support or leg. Sheet metal C. F. Kade
 Surgical appliance A. V. Todd
 Surgical bandage J. K. Toles
 Switch and fuse. Combined G. E. Clark
 Switch handle. Electric snap M. Guett
 Switch indicator. Rotary snap M. Guett
 Switch lock R. S. Bush
 Switch mechanism. Protected A. Sundh
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 H. T. Dumas
 Table receptacle for sandwiches, &c W. Weise
 Take up mechanism E. H. Ryon
 Tank and heater. Combined G. Thompson
 Tank lug G. P. Rasck
 Teeth. Instrument for holding artificial
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 Telegraph or telephone receiver. Wireless
 A. Plecher
 Telegraph. Type writing F. H. W. Higgins
 Telegraphy. Means for directing electric
 waves for use in wireless F. Braun
 Telephone alarm system J. D. Peachey
 Telephone. Alternating current A. Plecher
 Telephone exchange C. S. Exley
 Telephone exchange. Automatic W. B. Vansize
 Telephone transmitter support A. Gamache
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 Tenting machine J. H. Lowmsbury
 Terry fabric J. H. Margerison
 Threshing machine cylinder wrench
 J. T. Hume
 Threshing machine feeder J. D. Barton
 Tile J. M. Coffield
 Time recorder. Workman's D. Hepp
 Tire making machine. Pneumatic
 U. P. Smith
 Tire. Pneumatic T. J. Cooper
 Tool. Combination G. G. Gearhart
 Tool holder J. Dangerfield
 Tool. Pneumatic C. B. Richards
 Toy bank M. J. Wade
 Track device for inclined ways A. H. McClure
 Track sander C. E. M. Knight
 Traction engine C. S. Doney et al
 Train order catcher J. W. Woodard
 Train signal. Electric W. J. & J. P. Hare
 Tramway bucket clip E. A. Brown
 Transits. Solar and vertical sighting attach-
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 Trip coupling D. M. Motherwell
 Trolley L. L. Leathers
 Trolley H. M. Williams et al
 Trolley controller W. B. Leecraft
 Trousers and hose supporter. Combined
 R. F. Clarke
 Truck. Car G. J. Smith
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 Truck. House moving P. Dahle
 Truck attachment R. Weir, Jr
 Truck fastener J. S. Isidor
 Tubes. Means or apparatus for molding metal
 M. Sensenichmidt
 Tubular articles provided with diaphragms.
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 Tufting machine A. G. Eyles
 Tunneling machine J. P. Karns
 Turbine H. de Walden et al
 Turbine. Elastic fluid J. Wilkinson
 Turbines. Means for improving the efficiency
 of A. R. Dodge
 Turbines. Means for separating moisture from
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 Type under pressure. Apparatus for forming
 G. G. Little et al
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 Type writer actuating mechanism
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 Type writer connecting rod J. E. Mollie
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 Undergarment A. G. Velasko
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 Valves. Apparatus for manipulating slide
 W. R. Herring
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 Vehicle tuner. Attachable A. C. White
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 Vehicle wheel J. Lauth
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 Wheel W. Dewar
 Window frame assembling machine
 H. C. Smith
 Window lock H. F. Woodard et al
 Window. Pivoted O. A. Essig
 Window screen H. M. Kreh et al
 Window screen. Adjustable rolling J. O. Bowe
 Wire clamp J. E. Dusing
 Wire loom selvaging device J. McFaries
 Wire stretcher J. H. Heisey
 Wood fiber cutting machine G. E. Le Clair
 Wrench I. Martin

DESIGNS.

Easel S. G. Doherty
 File clamps. Member for paper W. C. Codman
 Lavatory F. J. Torrance et al
 Spoons, forks, or similar articles. Handle for
 6 pats. E. Crees et al
 Tile. Facing T. Woodward
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 Adding machine carrying mechanism C. Wales
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 Air. Utilization of compressed R. Nutty
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 Apron. Storm A. C. Holden
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 Baby comforter H. Spencer
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 Bandoleer and waist belt rifle carrier. Com-
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 Bedstead coupling E. F. Tubach
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 Binder. Temporary S. D. Page
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 Boiler scraper and cleaner H. C. Miller
 Bolt clipper H. K. Porter
 Boot or shoe leveling apparatus A. Webster
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 Bottles, &c. Stopper confiner for flexible
 C. F. Cushing
 Bracelets, rings, &c. Apparatus for making
 and ornamenting J. Arany
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 Briquet machine F. Meyer
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 Brush J. E. Currie Jr
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 Car coupling. Automatic W. E. Crook
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 Cards. Playing C. C. Meriwether
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 Cash carrier J. L. Baldwin
 Cash register M. Giesel
 Cash register E. J. Von Pein
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 Circuit breaker. Automatic E. M. Hewlett
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 Clothes pin J. G. Howard
 Clutch G. M. Beard
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 Coffee or tea pot percolator W. R. Montgomery
 Coffee pot indicator A. Uhalt
 Coffin dam and foundation D. D. McBean
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 Concrete mold A. Feigunson
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 Corn shocker W. B. Martin
 Cornet C. G. Conn
 Cotter H. Jung
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 Cotton or rice chopper H. E. W. Kirkland
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 Crate or box. Folding W. H. Rossley
 Cuff F. X. Mudd
 Culinary scraper B. Donaldson
 Cultivators. Jointed beam for I. A. Block
 Current meter. Alternating G. Stern et al
 Current motor. Alternating 2 pats.
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 Current motor. Alternating A. Churchward
 Currents of low periodicity. Means for produc-
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 Curtain and shade fixture. Combined
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 Curtain fixture T. Ebert
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 Cutting apparatus guards. Supplemental finger
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 Cycle driving and brake mechanism
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 Death determining instrument J. E. Storms, Jr
 Dental dies. Making C. A. Holmes
 Dental tool C. M. Freeman
 Dipper handle B. H. C. fey
 Dish washer G. W. Hunt
 Disk drill F. R. Packham
 Display rack J. V. Brooke
 Displaying advertising cards, display signs,
 &c. Mechanism for C. S. Sinclair
 Distillation of ammoniacal liquors. Appa-
 ratus for the G. Antoin
 Distribution system C. P. Steinmetz
 Dog training device F. H. Erb, Jr
 Door hanger A. F. Coulter
 Door strip A. Snorin
 Door window, &c. closing device
 G. C. Chaddock
 Draft equalizer W. H. Shell
 Draft rigging H. T. Krakau
 Draw gear and buffing apparatus M. E. Dayton
 Drying apparatus J. Olsen et al
 Drying frame E. A. Messerly
 Drying reel J. D. Guthrie
 Drive pipe J. A. & H. W. Hock
 Dumb waiter E. B. Everingham
 Dust beater R. O. Hammond
 Electric circuit closer and breaker
 T. H. McQuown
 Electric currents for low potential use. Means
 for modifying high potential L. Carpenter
 Electric distributing system R. Thury
 Electric generator. Multivoltage G. H. Gibson
 Electric light circuits. Automatic cut out for
 R. J. Patterson
 Electric light supporting drum C. W. Riley
 Electric motor G. H. Ennis
 Electrical elevator R. C. Smith
 Electrical windings from static strains. Means
 for protecting J. Pearson et al
 Electrode H. Blackman
 Electrode for electric tube lamps D. M. Moore
 Electrolytic apparatus H. B. Ford
 Electrothermic ventilator F. de Mare
 Elevator wells. Mechanism for opening or
 closing gates of J. Rashkin
 Engine cooling device. Explosion R. B. Weaver
 Engine crank shaft R. B. Weaver
 Engine steering wheel. Traction
 D. W. McLaughlin
 Engines with explosive mixtures. Apparatus
 for supplying explosive C. G. Dean
 Engines. Means for supplying water to the
 pistons of gas H. Richter
 Evaporating apparatus. Liquid G. Stade
 Excavating and dredging bucket or grapple
 C. A. Mardder
 Exhaust head W. F. Warden
 Explosive engine 2 pats. C. R. Dellenbach
 Eye testing instrument C. F. Kautlehner
 Eyes. Means for inspecting or testing
 J. E. Chambers
 Farm gate B. H. Pursell
 Fastener E. S. Gardner
 Feed water heater, circulator, and scumwer.
 Combined W. Cross
 Feeder. Automatic stock J. M. Manifold
 Feeder. Stock C. A. Wright

Fence machine. Wire J. A. Cocker
 Fence machine. Wire J. W. Dwight
 Fence. Portable disappearing I. B. Abraham
 Fence post I. Hawa
 Fence stretcher. Wire I. M. Warner
 File scraper H. L. Adams
 File. Vertical F. W. Tobey
 Filing case index attachment P. H. Y. woman
 Filter H. Q. Hood
 Filter E. & M. Schissel
 Filter construction and apparatus connected
 therewith S. H. Adams
 Firearm. Breech loading O. F. Mossberg
 Fire kindler J. A. Torney
 Fireproof building J. Scully
 Fish cleaning machine J. F. Keller et al
 Fish hook L. J. Hise
 Fish hook attaching device C. A. Abbat
 Floor plate or block. Parquet C. Amendt
 Flour. Vegetable G. Brown
 Fluid pressure. Developing and utilizing
 J. C. Fraley
 Flume. Sheet metal M. H. Laytoun
 Fly catcher J. Schnell
 Food chopper W. K. Henry
 Form. Bust A. M. Coleman
 Friction brake A. E. Keyolds
 Fruit jar M. W. Owens
 Fruit or vegetable cleaner O. H. & F. B. Perry
 Furnace R. Martin et al
 Furnaces. Support jacket or frame for cool-
 ing plates or coils in blast A. Farrell
 Furniture trimmings. Device for fastening
 D. W. Tower
 Fuse block M. R. Utley et al
 Fuse for projectiles. Delayed action
 C. V. Wheeler et al
 Fuse holder. Electric J. B. McCarthy
 Fuse. Plug J. H. Hanson
 Gage J. W. Melvin
 Gage and float therefor E. L. Wickins
 Game L. H. Riddle
 Game apparatus H. C. K. amer
 Garbage box T. E. Burrough
 Garment hanger C. F. L. Hoepfinger
 Gas burner W. A. Cook
 Gas burner controller P. F. Glazier
 Gas engine 2 pats. G. Westinghouse
 Gas generator. Acetylene J. S. Harger et al
 Gas generator. Acetylene J. J. Redder
 Gas heater J. G. Rodgers
 Gas. Manufacturing C. W. Lummis
 Gas producer G. Campion et al
 Gear. Reversible driving W. E. Gibbs
 Gear. Reversing E. E. F. Fagerstrom
 Gearing. Magneto frictional G. H. Gibson
 Glass articles. Apparatus for producing
 hollow P. T. Sievert et al
 Glass. Endless carrier for sheet
 R. L. Fink et al
 Glass. Melting J. T. C. Kessmeier
 Glassware or like articles. Carrier for
 W. B. Hughes
 Glucose. Making L. Roth
 Gold separator M. C. Wright
 Governor. Engine E. M. Hewlett
 Governor. Steam engine W. O. Webber
 Grain binder knotter G. W. Whittington
 Grain binder needle P. H. Bieman
 Grain binder twine can 2 pats. P. Hanson
 Grain drill seed tube L. E. Roby
 Graphite or other materials from associated
 impurities. Apparatus for separating
 I. F. Good
 Grinding machine H. A. Schuelbach et al
 Grinding mill G. A. Bell
 Grinding or crushing head V. W. Mason, Jr
 Grinding or crushing head or roll
 V. W. Mason, Jr
 Guns. Auxiliary barrel for breech loading
 V. C. Tasker
 Guns. Single trigger mechanism for double
 barrel O. H. Peak
 Hame fastener R. Dodson
 Hammer L. S. Starrett
 Harness W. Horning
 Harrow. Disk J. W. Ingie
 Harrow. Riding R. H. Harzell
 Harvester ejector attachment W. M. Piatt
 Harvesting and cleaning root crops. Machine
 for J. L. Timmons
 Harvesting machine flag or wind break
 P. Hanson
 Harvesting machine knife head G. Wilson
 Harvesting machine twine can 2 pats.
 P. Hanson
 Hay rake. Horse G. Wilson
 Hay sling W. A. Law
 Head protector I. Seitzman
 Heat indicator J. T. Smith
 Heat interchanger G. R. Jarman
 Heel attaching machine F. F. Raymond, 2d
 Heel pad. Elastic W. C. Corman
 Heel. Shoe L. P. Small
 Hide working machine A. A. Hutchison
 High or low water alarm K. C. Blake
 Hinge T. B. McCready
 Hinge. Spring A. F. Erquist
 Hinge. Spring C. H. O'Connell
 Hitching device J. M. Fair, Jr et al
 Hoing machine J. E. Hickey
 Hog catcher H. O. Carns
 Hoisting bucket A. E. Norris
 Horseshoe J. R. Holland
 Hose coupling W. W. Gibson
 Hub lubricating device. Vehicle
 A. F. Rockwell
 Hydrocarbon burner A. L. Merrill
 Ice making machinery W. J. Woodcock
 Ice. Producing plate W. J. Woodcock
 Incubator. Electrical F. C. Perkins
 Induction motor D. M. Bliss
 Ink fountain G. L. Richardson et al
 Insect trap G. A. Martin
 Insecticide J. H. & J. E. Yelvington
 Insulator for handled vessels. Heat
 C. K. Dechard
 Invalids. Warming device for use by
 E. H. Coates
 Ironing board P. A. Rasmussen
 Ironing board S. J. Brown
 Jar caps. Means for fastening B. Murr
 Jewel gaging machine D. H. Church
 Key mechanism. Silent M. Kellogg
 Keyboard attachment for stringed instruments
 F. G. Baker
 Knife attachment G. E. Crosley
 Knitting machine G. D. Mayo
 Knotter R. W. Hanton
 Lace fastener M. P. O' Connor
 Lace holder F. D. Davies

Lactometer.....E. C. Redfearn
Ladder.....F. M. Garrison et al
Ladder, Extension.....B. H. Ziegler et al
Ladder, Extension step.....H. E. Bruno
Lamp.....R. M. Dixon
Lamp.....G. Washington
Lamp, Electric arc.....H. Emonds
Lamp, Electric arc.....R. Hulsart
Lamp for liquid hydrocarbons, Incandescent
Lamp hanger.....R. E. Walther
Lamp igniter.....Electric.....A. L. Lind et al
Lamps, &c. Heating attachment for.....G. Watson
Lantern.....R. Black
Last.....J. D. Winchester et al
Last.....A. Norman
Latch.....N. Erickson
Latch, Gate.....D. M. McRae
Latch, Shutter.....C. H. Haggerty
Lathe dog.....A. Tindell
Lathe tool rest.....H. M. Darling
Launch spray hood.....C. H. Paine
Lavatory apparatus.....T. O. Potter
Ledger or binder leaf.....J. Baker et al
Letter box.....E. F. Wallace
Lever controller.....G. Baehr
Liquid dispensing vessel.....J. F. Medley
Liquid raising apparatus.....V. Schwaninger
Loading or unloading apparatus.....C. A. Long
Lock.....C. Reiger
Locomotive tender.....H. J. Small
Log carriage cushion.....H. G. Dittbenner
Loom, Filling replenishing.....A. M. Marcoux
Loom, Filling replenishing.....E. S. Wood
Loom fork grid clearer.....B. F. S. Austin
Loom, Swivel.....J. Wadsworth
Lubricator.....B. M. W. Hanson
Lubricator.....H. S. Burrell
Magnetic composition and making same.....K. A. Hadfield
Mail box.....W. A. Wheeler
Mail delivery apparatus, Suburban.....N. S. Howell
Manifolding pad.....C. H. E. Boughton
Malt and drying apparatus.....F. H. C. Mey
Marker.....F. H. C. Kocks
Measurements for garments, Appliance for taking.....H. W. Hilder
Measuring device.....J. Fritsche
Meat case, Dried.....G. W. Holman
Mechanical furnace.....J. Armstrong
Metal fibering machine.....A. L. Cole
Metal flanging machine.....T. Reis
Metal working tool.....A. Tindell
Metals from ores, Extracting.....E. B. Hack
Metallic structure.....W. H. Clarke
Metallic tie and rail fastener combined.....E. C. Herrold et al
Microscope.....A. F. Edney
Milk bottles, &c. Cleaning and sterilizing.....C. S. Adams et al
Milling and key seat cutting machine.....T. J. Bloss
Milling machine.....J. B. Foote
Mirror or electric lamp bracket.....B. F. Ordway
Mixing apparatus.....J. W. Tierney
Molder's slick.....L. A. Schulze
Molder's tool.....L. A. Schulze
Molding and casting apparatus.....J. R. McWane
Mortar and muller for grinding, crushing, and mixing ores, chemicals, &c.....T. Breakell
Motion transmitting device.....W. E. Gang et al
Motor stopping apparatus, Electrically controlled.....B. G. Barlow
Motors, Controller for alternating current.....A. Sundh
Music sheet punching apparatus.....H. Meyer
Musical instruments, Interchangeable roll for mechanical.....H. H. Juelg
Musical instruments, Wrist plate for stringed.....H. Hornbeck
Nail making and driving machine.....W. H. Lang
Nebulizer and means for attaching same to supporting tanks.....W. & J. Boeckel
Necktie.....J. Bernstein
Necktie fastener.....J. E. Glahn
Nipple holder.....W. Griffiths
Nitro product.....L. Edeleanu et al
Nut lock.....L. N. Everett
Nut lock.....J. D. Reed
Oar, Bow facing.....W. Lapacz
Observation plate, Transparent refractory.....E. Thomson
Odometer.....E. H. Hathaway
Oil burner.....J. R. Donnelly
Ore concentrator.....E. W. Keeler
Ore conveyor.....A. McCain et al
Ore crushing machine.....H. Yarnell
Ore roasting furnace.....A. M. Beam
Ore treating apparatus.....W. H. Adams, Jr
Packaging apparatus.....A. L. Holton
Packing for pistons, Metallic.....E. Perks et al
Packing, Piston rod.....M. Montgometry
Packing, Piston rod.....G. M. Ried
Packing, Rod.....C. B. Risley
Paddle wheel.....L. Vojacek
Pail fastening and sealing device.....H. G. Cordley
Painting and cleaning apparatus.....E. Vegiard dit Labonte
Painting machine, Shingle.....B. F. Smith
Paper cutter.....2 pats.....G. W. Perks
Paper cutters, &c. Gage for.....F. Sholes
Paper exhibitor, Wall.....W. J. Tway
Paper package, Rolled.....F. H. Hoberg
Paper trimmer.....A. J. Perks
Partition and furring.....W. N. Wright
Pen, Self filling fountain.....R. Conklin
Phonographic apparatus.....J. Castelin
Phosphorus and sulfur and making same, Compound of.....E. W. Wheelwright
Photograph exhibiting device.....A. Hattrem
Photographic developing apparatus.....A. Bartol
Photographic dry plate releaser.....G. J. Stage
Photographic objective.....W. Zschokke et al
Piano key frame adjusting device.....R. G. O. Muller
Piano tuning apparatus.....D. Long
Pianos, Expression device for self playing attachments for.....J. Wieser
Pianos, Pedal for self playing attachments for.....J. Wieser
Picture mechanism, Moving.....F. B. Cannock
Pipe joint, Swivel.....J. A. Connelly
Piston cylinder.....L. C. Kiser
Placket fastener.....A. D. Bell
Plant protector.....W. G. Smith
Planter and fertilizer distributor, Seed.....W. F. Edwards
Plaster, Means for stiffening wire.....H. L. Kubernuss

Plow.....J. W. Hoskins
Plow, Stirring.....B. H. Giger
Pocket, Supplemental coat.....J. A. Sweeney
Polishing machine.....E. J. Murphy
Pottery tissue and producing same.....E. Seidel
Powder puff.....E. M. Huot
Power transmitting apparatus.....2 pats.....J. H. Barnard
Precious metals, Extracting.....T. J. Grier
Pressure gage.....M. Luscomb
Printer.....C. A. B. Biley
Printer's block.....W. S. Timmis
Printer's form.....F. C. Leethem
Printing machine delivery mechanism.....G. F. Read
Printing machine register gear.....Web T. Cossar
Printing press feeding gage.....W. H. Bradley
Propeller.....H. C. Ingraham
Propeller, Screw.....J. B. Macduff
Propulsion mechanism, Vessel.....H. H. Little
Pulley, Expandable.....W. A. Peters et al
Pulley, Split.....J. E. Thron
Pulverizer.....W. M. Wheildon
Pump governor, Air.....S. B. Stewart, Jr
Pump, Rotary.....R. D. O. Johnson et al
Punching and shearing machine.....A. A. Koch
Rag dusting machine.....E. T. S. Thayer
Rail joint.....G. A. Pack
Rail system, Sectional third.....W. B. Potter
Railway contact box, Electric.....W. M. Brown
Railway, Electric.....W. B. Potter
Railway fog signaling apparatus, Detonator holder or clip for use in.....H. F. Clayton
Railway joint.....C. W. Duke
Railway repair and defect card holder.....2 pats.....A. M. Goodwin
Railway, Rope.....R. Pfaffenbach
Railway safety device, Inclined S. E. Jackson
Railway system, Electric.....F. W. Hild
Railway system, Third rail.....W. E. Wray
Railway tie.....W. H. Stults
Railway track structures, Template for use in the manufacture of.....N. W. Berkley
Ratchet wrench.....J. W. Muskett et al
Ratchet wrench, Reversible.....L. C. Snyder
Reamer.....F. P. Souder
Refrigerator alarm.....T. Varin et al
Refrigerator drip catching device.....A. Bernier
Relays, Balancing.....H. M. Sutton et al
Resisting device.....G. Baehr
Rifles, Practice barrel for.....P. Bergersen
Rolling pin.....W. L. Stanley
Rope cutter.....T. C. Rogers
Rotary engine.....H. T. Allen
Rotary engine.....W. H. Greene
Rotary motor.....A. Patschke
Rule planing apparatus.....H. C. Hansen
Sand blower and brake attachment.....J. D. Smith
Sand drying apparatus.....K. Tanner et al
Sash fastener.....J. F. McElwee et al
Sash lock.....J. M. Teamer
Sawmill.....J. Calvert
Saw mill carriage stop.....A. Niedermeyer
Saw mills, Upper saw guide for band.....H. G. Dittbenner
Scale, Spring.....W. F. Stimpson
Scarf and scarf pin securing device.....L. von Koppen
Scraper, Wheeled.....J. J. Gyldenborg
Scythe.....V. Czerniak
Seal.....L. A. Foote
Seat guard locking device.....S. E. Jackson
Secondary battery.....G. K. Hartung
Seeder bevel gear connection.....W. Fetzner
Seeding machine.....A. Ploss
Separator.....W. V. Meyer
Serum and preparing same.....W. P. Dunbar
Sewage ejector.....J. W. Cooney
Sewing machine.....J. T. Hogan
Sewing machine, Boot or shoe.....W. Goddu
Sewing machine thread controller.....J. Diehl
Sewing machine work plate operating mechanism.....L. Onderdonk
Shade holder.....H. J. Peters
Shaft coupling.....H. Breiding
Shaft, Variable speed counter C. M. Conradson
Shafting coupling.....E. J. Thompson
Sheeting.....D. D. McBean
Sheeting, Pilot.....D. D. McBean
Shelf bracket.....R. Mancha
Shirt.....G. D. Eighmie
Shoe.....G. Strootman
Shoe attachment, Coasting.....R. W. Jones
Signs, Means for operating electric.....W. Goltz
Silicon chlorides, hydrochloric acid, and alkali hydroxids, Producing.....F. J. Machalske
Silo.....E. B. Repp
Silver chromate.....C. H. von Hoessle
Sink and sink strainer.....J. Koslosky
Skirt supporter.....E. Jennings
Slicing machine.....P. Sommer
Slitting machine, Gang.....G. Maguier
Slotting machine toolholder.....J. Armstrong et al
Snow plow.....W. S. H. Heermans
Sodium, Manufacture of.....T. Ewan
Sole splitting machine.....F. M. Furber
Soles, Elastic tap for boot or shoe.....W. C. Corman
Spacing machine.....W. A. Gray
Sparkling device.....C. L. Barker
Spinning frame.....A. Parker
Spinning frame yarn controller and separator, Ring.....J. E. Tichon et al
Spinning machine flier.....F. Spence
Spool or bobbin shield or hoop.....W. B. Wilson
Stalk cutting machine.....P. J. Boggess
Stamp for receipting bills.....L. Greiner-Voigt
Starting gate.....F. A. Vianest
Starting machine.....W. R. Barling
Steam condensating apparatus.....W. J. Nuss
Steam separator.....H. Stormer
Steam shovel.....W. S. Russell
Sterilizing and drying apparatus.....L. L. Gross
Stirrup.....J. B. Dowell
Stirrup.....J. Heaton
Stone, Steam indurated.....J. A. Bell et al
Stove.....H. B. Robischung
Stove, Gas.....J. F. & F. O. Adams
Stovepipe or chimney thimble.....C. E. Hubbs
Stove support.....D. C. McFarland
Strainer bag support.....J. A. Mayhew
Stud member.....J. V. Washburne
Subaqueous working chamber.....D. D. McBean
Submarine work, Apparatus for.....C. Williamson
Surgical sling.....J. F. Janisch
Switch attachment, Automatic.....C. B. Blank
Switch stand.....J. P. Franks
Tachometer, Magnetic.....A. P. & C. H. Warner
Talking machine horns, Elbow fastening for.....H. C. Kestel

Telautograph.....G. S. Tiffany
Telegraph receiver, Wireless.....G. T. Swenson
Telephone, Answering and recording.....T. D. & C. J. Freese
Telephone exchange system.....W. W. Dean
Telephone system.....2 pats.....G. R. Ritter
Telephone tablet attachment.....G. M. Urie et al
Telephonic or other switchboards, Switching apparatus for.....F. W. Francis
Telephony, Multiplex.....W. M. Miner
Tent slide.....D. T. Abercrombie
Terminal box fixture.....H. A. Hoagland
Test trap or seal.....C. M. Breen
Testing and fumigating apparatus.....M. Schnaier
Thill coupling.....C. F. Goforth
Threshing machines, Automatic belt guide for.....G. S. Thompson
Threshing machine grain separator.....D. D. Noziger
Thrust fork.....S. B. Fleming
Tire, Detachable.....H. E. Irwin
Tire protector, Pneumatic.....G. E. & S. N. Mentel
Tire setting machine, Rubber E. R. Lampher
Tires to vehicles, Apparatus for applying rubber.....E. R. Lampher
Tobacco cutting device, Plug.....M. Kayser
Tongs, Fire.....J. L. Miller
Tool, Pneumatically operated percussive.....W. Payton
Trace end supporting device.....J. P. Phillips
Tracing machine.....G. H. Davis
Track and car.....S. E. Jackson
Traction wheel.....D. W. McLaughlin
Tramway for conveying crops or merchandise.....L. Ferreira
Trolley.....H. Holland
Trolley and air brake controller, Combined.....J. Kynock
Trowel.....W. S. Ward
Truck, Car.....B. W. Tucker
Truss.....J. U. Adams
Tunnel shield.....C. H. Bonnett
Tunnel, Subaqueous.....2 pats.....D. D. McBean
Turbine.....G. Zahikjanz
Turbine, Elastic fluid.....C. G. Curtis
Turbine, Steam.....G. Zahikjanz
Twine making machine, Grass.....T. W. Jerrems
Type machine matrix centering mechanism.....J. M. Dove
Type writing machine line marking type attachment.....A. B. Vance
Valve.....W. Kuhlmann
Valve.....E. B. Hack
Valve, Automatic telescope.....H. B. Saeter
Valve, Check.....W. J. Taube
Valve, Cut out or isolating.....I. Mayer et al
Valve lubricating device, Slide.....A. Kohn
Valve, Plug.....R. C. Blake
Valve, Pressure regulating.....H. Strater
Valve, Steam engine.....D. C. Prescott
Valve, Steam engine.....C. P. Altmann
Vehicle bodies, Weight indicating sliding and spring support for.....O. T. Dougherty
Vehicle brake.....J. T. Burton
Vehicle cooler, Motor.....R. E. Olds
Vehicle running gear.....J. H. Ferguson
Vehicle spring.....F. O. Farwell
Vehicle steering apparatus, Motor.....B. A. Stewart
Valve, Straightway.....E. S. Brady
Vehicle strut, Two wheeled.....H. Edeline
Vehicle wheel.....H. Pace
Vehicles for inspection and repair, Apparatus for raising.....W. R. Webb
Velocipedes, motor cycles, &c. Two speed gear for.....L. Lecarme
Vending machine.....I. C. Woodward
Ventilator.....F. G. Bates
Vertical underfeed furnace.....H. G. Cox
Vessels, Propelling.....C. F. Sautter
Vignetter.....M. V. Carter
Vises, Manufacturing.....J. L. Ware
Wagon top.....J. Pohlig
Wagons or cars, Device for deadening or minimizing shocks to.....I. D. Georgiewitz-Weitzer
Washing apparatus.....W. A. & O. M. Huffman
Washing machine.....J. P. Pfeiffer
Water, Apparatus for separating oil from.....E. Pravicha et al
Water closet flushing apparatus.....2 pats.....W. U. Griffiths
Water closet, Siphon.....W. G. Newton
Water cooler and filter.....C. E. McPherson
Water cooler equipment.....J. T. Cole
Water elevator, Pneumatic.....J. Johnson et al
Water from cellars, Apparatus for expelling.....W. U. Griffiths
Water heater.....W. B. Allen
Water heater, Electrical.....M. H. Schoenberg
Water or grain elevator.....B. Holcomb et al
Water power apparatus.....J. F. Williams
Water supply system.....O. T. Hungerford
Water tube boiler.....J. F. Hottman, Jr
Water tube boiler.....J. F. Sr., & J. F. Hottman
Weaner and udder protector, Calf or colt.....W. N. Cunningham et al
Welt slitting machine.....H. Lyon
Wheel and axle coupling.....F. G. Hughes
Whiffletree.....J. Kitzmiller
Wind instrument.....L. M. Ellis
Window screen.....D. J. La Due
Wire holder.....J. Sharp
Wire stitching machine feed device.....W. Shafer
Wire stretcher.....L. A. Preston
Wrapping machine.....J. H. Felmlee
Wrench.....B. McNeil
Zinc, Electrolytic refining of.....H. Paweck

DESIGNS.

Billiard table.....J. Ehrenpreis
Bottle.....A. N. Ritz
Brooch, button, or buckle plate or similar article.....2 pats.....S. A. Keller
Brooch plate or similar article.....E. F. Rueckert
Chair.....J. E. Teall
Cyclometer casing.....J. Alexander
Dress ornament, Fancy.....L. M. Keigher
Glove.....F. Schmidt
Silverware or similar articles, Handle for.....2 pats.....H. Weber
Silverware or similar articles, Lip for.....H. Weber
Silverware or similar articles, Spout for.....H. Weber

Silverware or similar articles, Tip for.....H. Weber
Stove.....O. D. & B. Hunt
Wagon body.....3 pats.....G. H. Barschow

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Acid, Purpurin alpha sulfonic.....K. Thun
Adder and subtractor, Pocket.....T. M. Minor
Advertising device.....E. Altman
Agricultural implement.....F. W. Miller
Air brake system.....H. R. Kuhn
Anatomical guard, boot, or pad.....W. W. Keen
Anodron, Fireplace.....A. A. Low
Anesthetic administering apparatus.....F. M. Richardson et al
Animal cover.....J. Murphy
Antifriction wheel.....P. Little, Sr
Arsenic fumes, Arresting.....R. Baggeley
Assayer's pulverizing apparatus.....J. Q. A. King
Automatic regulator.....D. R. Dodge
Awning, Window.....C. J. Conradt
Bandage, Suspensory.....E. R. Drake
Barrel holding and dumping apparatus.....C. E. Ringrose
Basin or bath fitting.....J. J. Wade
Bath cabinet heater, Sweat.....T. O. Carman
Bath tub.....2 pats.....I. W. Schmidt
Battery circuit breaker, Storage.....H. Garrett
Beam trammel and calipers.....R. A. Wilson
Bearing, Roller.....G. W. Sweeney
Bed and couch, Combined.....D. Schalk
Bed rail coupling.....A. E. Jacobson
Bed slat fastener.....A. N. Webb
Bed, Spring.....E. A. Crawford et al
Beer pipe cleaner.....E. M. Burroughs
Beet digger.....G. W. Gary et al
Bending machine.....W. H. Johnson
Bending machine.....J. H. Baker
Bicycle lock.....W. T. McNary
Bicycles, Pneumatic seat post for E. Brougham
Binder attachment.....W. Umbeck
Binder, Temporary.....J. J. Duffy
Binder, Temporary.....J. A. Mudd
Blasting caps, Device for protecting.....D. B. Gillies
Boat releasing device, Ship's.....W. H. Rothwell
Boat, Submarine.....D. F. Toomey
Boiler and furnace, Combined.....W. W. Bonson
Boiler brace.....J. F. Hottman, Jr
Boiler controller.....R. J. Flinn et al
Boiler furnace.....E. F. Comber
Book, Account.....J. H. Rand
Bookcase, Sectional.....W. A. Shimer
Bottle, Non refillable 2 pats S. C. Kindig et al
Bottle, Non refillable.....H. Engel
Bottle, Non refillable.....T. S. Philpott
Bottle valve mechanism.....D. H. Monks
Bowling ball.....J. T. Rice
Box fastener.....W. A. Anger et al
Boxes, Machine for making folding partition packing for shipping.....C. A. Haas et al
Bracket or clamp.....A. Sonstagen
Braid.....M. Mittendorf
Braiding machine.....L. W. Whitehead
Brake shoe and making same.....W. D. Sargent
Brewing.....H. E. Frees
Brick truck.....I. C. Jones
Bridge construction, Combined clamp and hanger rod for.....G. F. Ernst
Broom attachment.....C. D. Winne
Brush.....A. R. Wiens
Brush holder.....H. K. Brooks
Brush, Paper hanging.....W. W. Kerns et al
Bug gatherer.....F. Keener
Buggy top support.....W. H. Tully
Bung, Racking.....C. L. Schallitz
Buttons, Machine for filling character depressions in.....S. Thyberg et al
Cabinet, Disappearing door.....A. Pederson
Calculating machine.....A. E. Bergey
Calendar and pen rack, Combined.....T. von der Luhe et al
Calendar, Clock.....J. L. Woods
Camera lens carrier, Photographic F. B. Case
Camera, Photographic.....H. W. Hales
Can capping machine, Friction top.....F. Neal
Can filling apparatus.....H. J. Hain
Can opener, Adjustable.....F. L. Stork
Canning, Machine for preparing fruit for.....2 pats.....W. J. Latchford
Car and door therefor, Hopper gondola.....R. V. Sage
Car bottom.....E. W. Summers
Car brake.....V. Waid
Car coupling.....T. Chew
Car coupling.....P. Hien
Car coupling.....L. C. Carter
Car coupling.....M. McConway, Jr
Car coupling auxiliary connection.....W. N. Shephard
Car door.....E. J. Lasher
Car door.....H. Carlton
Car door, Grain.....A. G. Steinbrenner
Car, Dumping.....S. J. Johnson
Car, Dumping.....E. I. Morey
Car floor frame.....H. Carlton
Car frame, Mine.....J. E. Jones
Car loading apparatus.....2 pats.....R. Baggeley
Car, Observation.....J. Pejchar
Car, Transfer stock.....F. C. Roberts
Car underframing, Railway.....G. I. King et al
Car vestibule diaphragm.....S. D. Fuller
Car wheel.....H. V. Loss
Cars, Electrical annunciator for trolley.....I. J. Bradshaw
Carbureter.....C. E. Sayre
Carbureter, Explosive motor.....F. & G. Longuemare
Carbureter, Gas engine.....P. H. Brennan
Carding machine feed roll attachment.....M. H. Gallagher
Carpet fabric, Woven.....T. Daffin
Cartridge decapping tool.....H. M. Olney
Cash register.....T. E. Davis
Caster.....J. W. Lawrence
Casting machine.....2 pats.....R. Baggeley
Casting machine, Metal.....R. Baggeley
Castings, Producing carbon steel.....J. C. Davis
Cattle delivering means.....H. Bargeboer
Chain links, Making.....D. Carroll
Chair and couch, Convertible.....F. S. Brown
Cheese cutter.....A. H. Hill
Chuck, Plate.....J. W. Carleton
Churn.....G. Geer
Chute, Spiral barrel.....G. W. Allen
Circuit closing device.....O. B. Thompson et al

- Clasp H. R. Baker
 Claw bar F. D. Holbrook
 Clock, Geographical G. Jaeger
 Closet seat cover W. D. Laner
 Clothes line holder W. P. Sampson
 Coal furnace, Soft C. S. Hood
 Coat W. E. Smith
 Cock, Gas regulating A. M. Gummer
 Coffee pot C. A. Robertson
 Coin receptacle H. J. Valentine
 Coke drawer D. Ferguson
 Collar fastener A. Reed
 Collar, Fold W. Hess, Jr.
 Collar stretching and measuring apparatus J. C. & R. A. Doring
 Composition material G. H. Moore
 Computing and recording machine F. S. Baldwin
 Conduit joint mold box E. L. Du Bois
 Conduit section dowel pin C. J. Field et al
 Container joint W. L. Austin
 Converter R. Baggaley
 Conveyor W. T. James
 Cooling board C. E. Windom
 Cooling board A. H. Emigh
 Copper matte, Converting R. Baggaley
 Copper, Refining R. Baggaley
 Cord shortening device J. H. Seaman
 Corn husker feeder C. W. Brierton
 Corn husking device W. L. Switzer
 Corn husking machine J. H. & H. Koeling
 Coupling for air or other ducts S. L. McAdams
 Cradle motor attachment M. W. Robinson
 Crane arm E. G. & C. W. Wood
 Crate, Knockdown J. E. Symes et al
 Crate, Shipping G. E. Hallaron
 Cream separator S. R. Barhite
 Crossin, Noiseless P. J. Lassen
 Cultivator, Lister O. E. Johnston
 Culvert A. Lauritzen
 Curb and conduit, Combined R. Raby
 Curling iron heater J. M. Lawlor
 Current controlling device, Automatic P. R. Owens
 Curtain cord winder E. G. Bennett et al
 Curtain fixture H. E. Keeler
 Cut out, Automatic C. A. Borein et al
 Dampener, Spring E. Denegre
 Dash brace, Vehicle N. B. Stone
 Dial plate J. F. Stevens
 Die and reamer, Combined A. O'Brien
 Dining room service, Continuous H. I. Washburn
 Dish drainer M. G. Reeves
 Disinfecting apparatus L. Vandam
 Display rack or stand S. Erb
 Door alarm A. R. Strahan
 Door hanger W. B. Smith
 Double boiler A. J. Wentzel
 Draft equalizer H. R. Tomson
 Dredge R. R. Osgood
 Drill pressure device E. H. Ackerman
 Drilling apparatus C. T. Upton et al
 Drilling machine W. A. Kagelmacher, Jr.
 Driver's seat, Adjustable T. M. Ramsay
 Educational appliance H. O. Dunn
 Egg cutter guide and regulating device G. J. Haslam
 Electric battery S. Yai
 Electric battery M. R. Hutchison
 Electric conductor C. M. Clark
 Electric fixture tripod box J. E. Eroambrack
 Electric lighting system J. F. McElroy
 Electric motors, Controlling M. Waddell
 Electric motors, Means for controlling M. Waddell
 Electric switch A. Rivenburg
 Electrical connection F. J. Russell
 Electrical distribution system J. H. Hallberg
 Electrical receptacle P. H. Fielding
 Electrical regulation system M. Moskowitz
 Electrical wire support B. Cullen
 Elevator bucket S. E. Flock
 Embroidery silk frame M. V. Westbrook
 Emery wheel dressers, Hand device for holding W. H. Gilbert
 Engine electric igniter, Gas G. J. Rathbun
 Engine exhaust box or silencer, Explosion A. Krebs
 Engines, Circulating apparatus for internal combustion G. J. Murdock
 Exhibitor, Curtain D. J. Haviland et al
 Explosion engine W. C. Weatherholt
 Eyeglass fitting J. C. Schmidt
 Eyeglass frame A. S. Van Denburgh
 Eyeglasses L. Kleb
 Eyeglasses G. H. Mayer
 Fan H. M. Kissling
 Fatty substance and making same O. Liebreich
 Feed water heater W. M. Wright
 Feed water heater and purifier T. V. Elliott
 Feeding and band cutting mechanism F. S. Rich
 Fence C. T. Hammett
 Fence weaving machine E. G. Overholt
 Fence, Wire J. S. Barnes
 Fiber cleaning machine, Vegetable T. Finigan
 Fifth wheel antirattler F. V. Wilcox
 Filter A. N. Clark
 Filter, Revolvable G. Moore
 Fireplace D. C. Simons
 Fireproof construction H. L. Kubernuss
 Fish spear A. J. Campbell
 Fishing reel with adjustable head A. F. & W. Meisselbach, Jr.
 Floor and strengthening member therefor P. M. Bruner
 Fluid pressure, Developing and utilizing apparatus J. C. Fraley
 Fluid pressure, Developing and utilizing J. Fraley
 Fluids, Regulating the supply of F. Windhausen, Jr.
 Flushing apparatus R. F. Gillin
 Folding chair H. G. M. Howard
 Form, Garment A. K. Maxwell
 Fruit sizing machine A. C. Burk
 Fuel blocks or briquets, Manufacturing O. Neugebauer
 Fuel, Composition of matter for artificial A. Lohmann
 Fuel into combustion chambers, Apparatus for injecting pulverized C. H. Gifford
 Furnace T. V. Elliott
 Furnace feeder W. T. Barker
 Fuse or cut out, Electric L. W. Downes
 Game apparatus J. A. McKenzie
 Game, Card H. E. Gavitt
 Garment fastener M. F. Eisner
 Gas burner and heater, Regenerating J. W. McKnight
 Gas burner mantles L. Pippitt et al
 Gas burner regulator W. G. Midgley
 Gas engine L. H. Nash
 Gas generator, Acetylene O. Parker
 Gas generator, Acetylene L. P. Powell
 Gas, Manufacturing C. F. Brush
 Gas or liquid supply pipes, Cut off apparatus for F. W. A. Wiesebrook
 Gas producing charger G. Sieurin
 Gases, Apparatus for arresting impurities from furnace R. Baggaley
 Gases, Apparatus for precipitating injurious fumes from smelter R. Baggaley
 Gases, Apparatus for removing impurities from furnace R. Baggaley
 Gases, Apparatus for the treatment of furnace R. Baggaley
 Gases, Recovering values from smelter R. Baggaley
 Gear wheel F. Saxon
 Gearing L. S. Clarke
 Gearing, Power transmission G. E. Whiteside
 Generator or motor suspension M. Waddell et al
 Glassware, Apparatus for fire finishing A. R. Grotz
 Globe or mantle protector J. L. Cavanaugh
 Go-cart 2 pats. F. E. Southard
 Grain binder C. A. A. Kaud
 Grain binder shaker attachment C. J. Dowling
 Grain cleaning, scouring, and cooling device F. W. Hess
 Grinding mill J. C. Bowsher
 Guano distributor J. S. Byrd
 Handle fastener R. S. H. P. & E. C. Hoyt
 Harness breast bow C. Severns
 Harrow riding attachment A. W. Perry
 Harrow, Rotary T. S. Wagoner
 Harvester reel W. H. Lightcap
 Harvester shocking attachment, Corn D. T. Phillips
 Hat and coat rack, Bedstead W. J. Dick
 Hat brim curling machine D. Clerico
 Hat pin S. Wilkins
 Hay press J. B. Hall
 Hay press W. F. Nanney
 Hay sling lock F. B. Strickler
 Heating and evaporating apparatus, Continuous motion H. D. Perky
 Heating element, Electric J. F. McElroy
 Heddle bar or support clamping device E. S. Stimpson et al
 Hides or skins, Machine for treating F. J. Perkins
 Hinge J. Soss
 Hinge S. J. Hogan
 Hinge, Convertible A. F. Enquist
 Hinge, Gate J. D. Parkinson
 Hinge, Spring E. Bommer
 Hip reducer and hose supporter, Combined M. E. G. Darrah
 Hitching device F. Obols
 Hook and eye C. E. Penman
 Horse controlling device J. V. Higgins
 Horse overshoe G. Batty
 Horseshoes, Making composition G. J. Peacock
 Hose and making same, Armored E. T. Greenfield
 Hose coupling, Armored E. T. Greenfield
 Hose supporter A. H. Cohn
 Hot air furnace P. M. Bruner
 Hot air heater C. F. Brand
 Hydrant, Automatic T. F. Murphy
 Hydrocarbon burner C. Knobs
 Hydrocarbon burner, Liquid D. J. Chanchester
 Hydro pneumatic engine L. Kessler
 Ice conserver H. S. Van Fleet
 Incandescent mantle frame E. Lippitt
 Incandescent mantle package J. I. Robin
 Indicator W. E. Adams
 Indicator C. F. Pidgin
 Insect destroying machine M. C. Kelley et al
 Insect trap H. Andrews
 Insulator S. Bower
 Insulator hanger or bracket G. H. McFeaters
 Internal combustion engine E. Korting
 Iron bars, Cross jointed K. Zucker
 Ironing board J. T. Jennings
 Jewel setter W. F. Boast
 Joint and pipe support N. Brennan
 Journal lubricating device R. Baggaley
 Justifying mechanism F. B. Converse, Jr.
 Label making and printing machine F. Waite
 Lacing attachment, Shoe A. A. De Loach
 Lacing, Shoe J. McMahon
 Lamp T. S. Leese
 Lamp chimney or bottle carrier E. P. Henigan
 Lamp, Electric arc M. A. Stogstill et al
 Lamps, Revolving canopy attachment for M. J. Murdoch
 Land roller R. S. Buch
 Latch spindle bearing F. W. Schneider
 Leather board or similar material, Machine for manufacturing A. H. Thompson
 Leather creasing machine H. L. Plummer et al
 Ledger or similar book, Bank J. H. Rand
 Leg, Artificial J. Johnston
 Linotype machine J. K. Van Valkenburg
 Loading apparatus R. Baggaley
 Lock J. Schnell
 Lock box E. L. Krag
 Locomotive track sanding apparatus, Alarm valve for C. Longstreth
 Log car toggle chain release W. Ashcraft et al
 Loom filling stop motion W. A. Fowler
 Loom, Needle B. Saner
 Loom shuttle box motion F. Hofmann
 Loom shuttle lubricating device D. McTaggart
 Low water alarm J. Arrance
 Mail bag C. H. Burton
 Mail chute F. E. Anderson
 Mailing wrapper E. H. Callahan
 Marking machine S. I. Prescott
 Match H. Gair
 Matte, Converting R. Baggaley
 Measuring instrument, Angle F. E. Hutchins
 Meter coupling F. Sheridan
 Milk can L. Harvey
 Milk compound and producing same, Synthetic W. A. Hall
 Milk cooler, Hydraulic Z. C. Womble
 Milk product resembling cheese and making same J. H. Campbell
 Mines, & Safety mechanism for winding apparatus for J. Berry
 Molder's flash M. A. Clapp et al
 Monkey wrench T. J. Robertson
 Mower, Lawn W. Duckett
 Mowing machine attachment reissue
 Mud guard and luggage carrier, Combined A. T. Taylor
 Muffler and chest protector, Combination L. E. Schoch et al
 Multicircuit controller W. M. Scott
 Musical instrument, Self playing L. B. Dorman
 Necktie fastener H. E. Curtis
 Necktie holder L. F. L. Ponchon
 Needle threader W. A. Johnston
 Nicotin trap and smoke cooling appliance for tobacco pipes W. A. Ede Clendinnen
 Nozzle directing device E. J. Lasher
 Nut lock J. A. Christ
 Nut lock W. Cronk
 Nut lock F. L. McGahan
 Oak lock E. Montreuil
 Oil burner J. McFarlane et al
 Oil burner W. R. Smith
 Oils, Machine for testing the lubricating power of H. V. Blake
 Open air furnace A. Boyer
 Optometer A. J. Shellman
 Ores, Recovering values from Silicious R. Baggaley
 Oven, Bake H. J. Wade
 Oven reflector attachment W. C. Crowbridge
 Oxyhydrocarbon burner C. W. Turner
 Padlock, Permutation C. O. Tooker
 Paper bag machine L. P. Eisenbeis
 Paper, & C. Machine for perforating J. B. Allen
 Paring machine, Wall J. K. C. Scheer
 Pencils, penholders, &c. Rack for J. Adair
 Percolator, Coffee G. B. Fyfe
 Perforating machine A. M. Bovier
 Photographic developing machine B. J. Holcombe
 Photographic negative cleaner H. C. White
 Photographic plate and film, Isochromatic L. Smith
 Photographic printing frame M. W. Armstrong
 Piano pedal attachment H. Kind
 Piano, Violin L. Breitenmoser
 Pick blades or other tools to their handles, Means for attaching G. Tippet
 Pickling vat weight C. G. Deible
 Pipe bracket, Steam A. J. Beaton
 Pipe cutting tool F. A. Headson
 Pipe die and reamer, Combined A. O'Brien
 Pipe trimming tool L. Emoud
 Pipes, Means for coiling C. L. Schallitz
 Pistol, Match shooting J. J. Marshall
 Plane J. W. Carleton et al
 Plane iron J. W. Carleton
 Planimeter F. R. Williams
 Planter, Combined corn and potato D. J. Sigfridson
 Plate finishing machine E. D. Tucker
 Plow J. C. Campbell
 Plow attachment W. H. Betts
 Plow handle S. Bredahl
 Plumb, Mason's M. Moran et al
 Pneumatic actuating device G. S. Williams
 Pneumatic despatch apparatus B. C. Batcheller
 Pneumatic tubes, Sending device for B. C. Batcheller
 Powder, Apparatus for molding smokeless F. I. Du Pont
 Power, Means for transmitting and equalizing variable L. E. Gaylord
 Preserving jar J. M. Grau
 Pressure regulator S. L. McAdams
 Printing A. Hoz
 Printing machines, Pneumatic laying off apparatus for cylinder W. M. Rockstroh
 Printing press C. H. Cochrane
 Printing press shoe fly J. J. Mosher
 Printing wall paper, Hand press for E. A. Popcke
 Propeller E. Bruncker
 Pump actuating device for steam engines, Air G. B. Petsche
 Pump, Air T. N. Case
 Pump engine, Steam J. A. Reed
 Pump, Interchangeable cylinder G. A. Krohn
 Pump, Rotary H. O. Evans
 Pump, Submerged force F. B. Davis et al
 Pumping engine G. A. Krohn
 Puzzle E. B. Kirk
 Puzzle N. B. Stone
 Quill tip finish J. J. Robinson
 Quilling machine R. Atherton
 Rail chair and joint P. J. McCann et al
 Rail cover, Third H. C. Morgan
 Rail fastener J. Owen
 Rail joint C. G. Ford
 Rail joint W. A. Moffat
 Rail joint F. W. Wilhelm
 Rail joint G. A. Weber
 Railway block signal, Automatic P. A. Sawyer
 Railway, Electric R. Hubner
 Railway frog W. A. Chapman
 Railway, Pleasure G. S. Crane
 Railway rail H. B. Yost
 Railway rail ends, Device for increasing the vertical and lateral stiffness at the juncture of J. M. Griswold
 Railway structure S. F. Seely
 Railway switch J. P. Pulsifer
 Railway tie S. Dreibelis
 Razor handle A. A. Langdon
 Razor stop R. B. Jackson et al
 Receptacle closure J. E. Gavlin
 Receptacle, Non refillable H. W. Avery
 Refuse destroying apparatus G. Watson
 Rein holder J. R. Carroll
 Rein holder and guide, Combined J. I. Stamper
 Roller and harrow, Combined G. W. Larison
 Roller, harrow, and cultivator, Combined O. A. Gallatin
 Rolling mill, Universal R. D. York
 Rotary engine L. J. Le Bond
 Rotary engine C. Guyer
 Rotary engine reissue A. Guindon
 Rotary meter W. H. Larrabee
 Rotary steam engine J. J. Walley
 Rotary steam engine D. P. Tapua et al
 Ruler, Parallel J. W. Glaholm et al
 Sad iron G. Holz, Jr.
 Saw handle G. W. McMillan
 Saw handle T. Laughlin
 Saw making machine A. H. Cruse
 Saws in cutting down trees, Contrivance for actuating hand R. C. Stillfried
 Scale C. F. Christopher
 Scale, Coin controlled weighing A. Olson
 Scale or weighing beam A. B. Callin
 Scarf pin G. W. Dover
 Screening separator A. N. D. P.
 Scrubbing machine P. E. Timmer
 Sealing and stamping machine, Envelope J. E. Lester
 Sealing cap for vessels under pressure J. M. Hicks
 Sealing vessels, Means for J. M. Hicks
 Seeding machine, Disk drill J. S. Rowell
 Separator R. W. Jesup
 Sewing machine blindstitching attachment E. Donaldson
 Shade hanger, Adjustable J. C. Forsberg et al
 Shade roller holder, Window G. L. Smith
 Shaft, Flexible H. P. Brown
 Shampoo bowl stand M. & H. Romagn
 Shears holder S. H. Shank
 Shoe fastening J. W. P. Bunning
 Shoe holder R. W. Snowdon
 Shoe holder and stretcher H. C. Pomeroy
 Shoe lining marking machine W. J. Dix et al
 Shutter, Rolling P. Ebner
 Sign H. L. Casperson
 Signaling device, Electrical H. C. Giles
 Silo W. B. Cannon
 Slag boiler R. Baggaley
 Slag heated boiler 2 pats. R. Baggaley
 Slate ruling device, School J. E. Dundore
 Slip and shrinkage gage A. J. Wold
 Smelting furnace, Copper R. Baggaley
 Smoke consumer H. Wilkins
 Soap manufacturing apparatus A. Flagendorf
 Socket member J. V. Washburne
 Solder saving machine J. D. Kyser et al
 Soldering block, Adjustable A. B. Webster
 Sole pressing machines, Adjusting device for forms of E. E. Winkley
 Spark arrester I. N. Kalbaugh
 Sparking device J. S. Thurman
 Speaking apparatus P. Vogel
 Spectacles or eyeglasses C. B. Bishop
 Spring F. P. D'Arcy
 Square and adjustable bevel, Combined try square, Center J. J. Crozier
 Square, Universal T. P. Roy
 Stable floor R. S. Judson
 Stairway, Traveling E. M. Fraser
 Stamp affixing apparatus, Postage C. Welter et al
 Stamp affixing machine S. Farmer
 Stamp, Postage or other C. O. Snavely
 Staple driver T. B. Modlin et al
 Starch, Manufacture of A. A. Osborn
 Stay bolt, Flexible F. Burger
 Steam boiler J. P. Sneddon
 Steam boiler G. F. Spencer
 Steam engine W. Dieter
 Steam engine for pumps, &c. W. Viggers
 Steam generator F. S. Smith
 Steaming tray F. Sochurek, Sr.
 Steel, Manufacturing C. N. Burton
 Stirrup W. L. Myers
 Stone dressing lathe E. R. Cheney
 Stone, Mold for making artificial F. L. Dykema
 Storage battery R. N. Chamberlain
 Stovepipe fastener F. E. Mason
 Street sweeper D. B. & W. R. Cliffe
 Street sweeper A. S. Young
 Structural element and producing same W. Smith
 Sugar, Making J. O. Schweitzer
 Supporting stand A. G. Park
 Suspenders, Stocking J. F. Storey
 Switch operating mechanism T. Rundoff
 Switch stand W. W. Allen
 Switching apparatus W. Kailing
 Switchboard J. B. Wood
 Tack pulling machine C. L. Eaton
 Telephone bracket H. S. Waite
 Telephone directory F. H. Chamberlin
 Telephone switching apparatus N. A. Engstrom
 Telephone system W. W. Dean
 Telephone system, Selective A. Gagnon
 Threshing machine G. M. Absalom
 Threshing machine feeder I. S. Wood, Jr.
 Threshing machine feeder J. F. Henner
 Ticket system, Transportation P. C. Dockstader
 Tie plate L. A. Hoerr
 Tile G. B. Staples
 Tile, &c., made of vitrified clay F. W. Braunstein
 Tiling G. P. Chappell
 Tinning machine H. L. Bradley et al
 Tire repair device, Pneumatic J. R. Vosburgh
 Tobacco pipe mouthpiece attachment W. A. England
 Tongue support, Vehicle B. H. Oldfield
 Toothpick machine H. P. Churchill et al
 Toy bank G. H. Spafford
 Toy bank M. J. Wade
 Toy motor, Electric W. Broad
 Toy, Wheeled L. I. Dickinson
 Traction on the conduit system, Apparatus for use in electric E. Vedovelli
 Traction system, Alternate current W. M. Mordey et al
 Trains, Automatic system for stopping and slowing down J. A. Guerin
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 Transom regulator J. H. Glassburn
 Traveling bag umbrella retainer S. Wenzell
 Trigger mechanism, Single J. P. White
 Trolley F. A. Merrick
 Trolley for electric railways, Underrunning C. A. Singer
 Trolley guard and fender W. F. Reichenbach
 Trolley pole T. F. Wetton
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 Trolley wire hanger 2 pats. J. Antiga
 Truck E. Peckham
 Trunk J. M. Martin
 Tube expanding tool C. Roedmann
 Tubing C. D. Frees
 Turbine bucket, Detachable 2 pats. H. G. Reist
 Turbine buckets to wheels, Means for attaching H. G. Reist
 Turbine, Fluid pressure H. F. Fullagar
 Turbine, Steam T. Schiemer
 Twine cutter G. E. Banton
 Type writing machine paper feeding device A. A. Hill
 Uncoupling device, Automatic safety J. T. Lindqvist
 Underclothing C. M. & J. E. Mackenzie
 Undergarment G. A. Frisbie
 Valve S. Mertens
 Valve and operating F. J. Platt et al

Valve. Automatic.....C. B. Shaw
Valve. Automatic shut off.....N. C. Locke
Valve. Electrically controlled.....O. Jaunggren
Valve. Engineer's brake.....P. Ackermann
Valve. Flush.....L. T. Dery
Valve mechanism. Engine.....H. Nielsen
Valve mechanism for flushing closets. Automatic.....H. Dixon, Jr.
Valve operating and controlling mechanism.....H. V. Conrad
Valve. Rotary.....D. W. Rantine
Valve seat and packing ring. Combined.....C. Sutton
Vehicle brake.....H. Schwenck
Vehicle fender. Street.....F. E. Wilcox
Vehicle gear.....F. E. Wilcox
Vehicle hubs. Means for attaching brake drums to.....W. A. Cornell
Vehicle wheel.....J. W. Gray
Vending machine.....O. E., E. E., & W. L. Clark
Vending machine.....C. J. Neth
Vending machine.....W. W. Munger
Vending machine fraud preventive device.....W. Sloan et al
Ventilator.....W. G. Gagne
Vessel caps. Means for securing.....J. M. Hicks
Vessel crane.....D. F. Macdonald
Vessel neck and sealing cap for same.....J. M. Hicks
Voting machine.....N. Prince
Waffle iron.....Q. Crane
Wagon mechanism. Tip.....A. Mausfield
Wall mold core.....A. T. Boise
Wall register.....L. J. Mueller
Warehousing apparatus. Automatic.....R. Baggeley
Warehousing machine. Automatic R. Baggeley
Washboiler attachment.....J. F. Deab
Washing machine.....E. Evans
Washing machine journal.....J. A. Meese
Washer.....M. S. Brigham
Water level indicator.....W. Peers
Water supply apparatus.....R. Baggeley
Water supply systems. Drainage means for.....R. F. Lindsay
Water tube boiler.....H. Lawson
Weather strip. Door.....W. E. Veber
Weighing apparatus.....E. G. Thomas
Weighing machine. Automatic E. G. Thomas
Weighing machine. Coin controlled F. Verplast
Weighing or packaging machines. Uniform feed mechanism for.....G. F. Turner
Well points. Protective covering for drive.....C. H. Redfield
Well screen.....G. J. Karsch
Wells. Wall packer for oil.....H. Smith et al
Wheel guard and sander.....W. Lintern
Wheel securing device.....W. E. Ayres
Window frame and sash. Metallic.....J. Eberle
Window screen.....E. C. Linck
Window screen.....S. U. Tarney
Wire coverer.....H. C. Boyle et al
Wire hoop making machine.....A. J. Bates
Wire stretcher and lifting jack F. E. Morehouse
Wire working tool.....J. W. Alkire
Wireless communication receiver.....G. Morin
Woven fabric.....M. G. C. ins
Writing cabinet.....L. & J. M. Jones
Wrench.....G. R. Cheesman
Wrench.....C. S. Leland
Wrench.....H. A. Kerslake
Wrench.....J. A. Hardy et al
Wrench.....W. L. Jackson
Wrench.....I. Shoop
Wrench.....J. T. Myers
Yarn chain unwrapping mechanism W. Baxter

DESIGNS.

Back bar fixture.....J. Ehrenpreis
Basket.....A. P. Marshall
Bottle.....J. F. McGuire
Brooch, button, or buckle plate or similar article.....S. A. Keller
Comb. Pompadour dip puff.....B. W. Doyle
Flooring. Tile.....L. L. Silvers
Lamp body.....R. H. Welles
Pipe. Indian peace.....A. S. Speirs
Rein holder.....S. A. Harrell
Spoons, forks, or similar articles. Handle for.....E. Crees et al

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Abdominal support.....F. W. Clark
Acid and cyanid salt therefrom. Making hydrocyanic.....J. H. Paul
Acid and cyanids. Manufacturing hydrocyanic.....J. Tcherniac
Adhesive applying mechanism.....J. C. F. Balze
Air brake safety device.....J. H. Luckey
Air heating apparatus.....J. T. Farmer
Alkali cyanid and alkali metal. Simultaneously producing.....P. Danckwardt
Alkaline metals. Making chromates of the.....F. M. & D. D. Spence et al
Amusement device.....O. A. Needham
Anchor. Subterranean.....C. F. Perslaw
Anti incrusting device and water purifier.....N. W. Yantis et al
Ash receiver and paper weight. Combined.....P. A. Robson
Atomizer. Perfumery.....R. W. Moore
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Bag holder.....C. W. Olin
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Barium sulfate and zinc chloride. Obtaining.....W. D. Gilman
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Bearing. Antifriction.....D. E. Kempster
Bed. Folding.....E. L. Kirk
Bed movement.....G. F. Read
Bed or couch bottom.....J. Hoey
Bedstead.....J. P. Lein
Beehive comb foundation.....H. A. Feldmann
Beer tap.....P. B. Abrell
Bell. Party line.....L. Moore
Belt. Lady's.....V. R. Humphrey
Belt. Waist.....J. Forman
Binder or file. Loose leaf.....J. F. Cordes
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Continued in February Number.

Money in Honey!

THE AMERICAN BEE-KEEPER

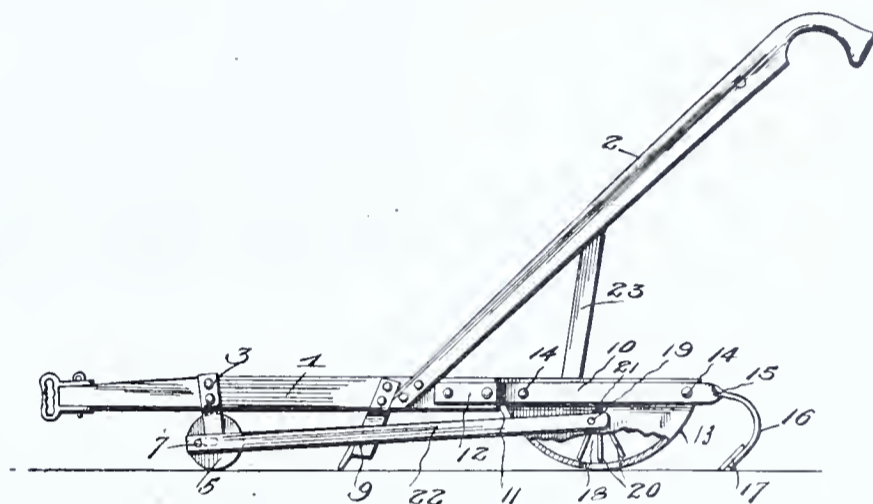
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Mr. Francis Wesley Key, of Staunton, Georgia, whose picture heads this article, has patented an improvement in cotton planters. The cotton planter, which is exceedingly simple and inexpensive in construction, is light, strong and durable, and adapted to be attached to an ordinary plow stock.



In the accompanying illustration, 1 designates the beam, and 2 the handles which are attached to the beam some distance from the rear end of the latter. Standard bars 3, are bolted at their upper ends to the beam; one of the standard bars is straight, and the other has a lateral offset 4, near its upper end to increase the space between the standard bars.

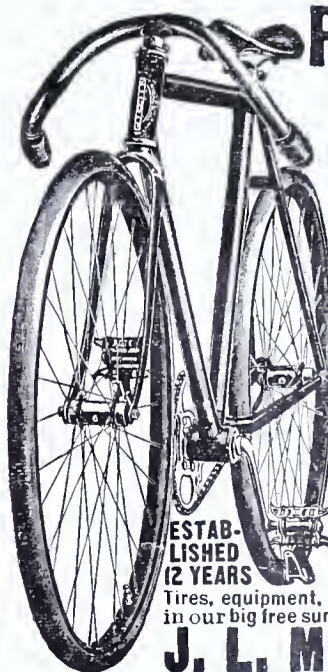
Between the lower portions of the standard bars is mounted a ridge roller 5, which has a concave tread for causing it to hug the crest of the cotton ridge or bed, and thereby adapt the planter to be readily retained thereon. A furrow opener 9 is arranged a suitable distance in rear of the ridge roller for opening a furrow in the crest of the

ridge for the reception of the cotton seed.

A pair of horizontal longitudinally disposed arms 10, are bolted at their front portions 12 to the rear end of the beam, and are provided with lateral bends 11, which space the rear portions of the arms 10, sufficiently to receive a semicircular hopper 13. The hopper is secured to the arm by means of bolt-rods 14, and the rear portions of the arms 10 are provided with quarter turns 15, and are curved downwardly at 16. These downwardly curved portions 16 support a covering-board 17. The bottom of the hopper is provided with suitable openings, and a positive feed of the seed is effected by means of a seed stirrer 18, mounted on a shaft 19, and provided with stirring fingers 20 which radiate on the shaft. One end of the shaft 19 is provided with a crank 21, and a pitman 22 extends therefrom

to a crank 7 of the shaft or axle of the ridge roller. When the planter is in operation, an oscillatory motion will be imparted to the seed stirrer 18, so that the seed will be caused to drop from the hopper into the furrow on the ridge. The seeds are covered by the covering-board 17. A brace 23 extends from one of the arms 10 to one of the handles to brace the latter and to afford a firm connection between the same and the arms, which carry the hopper. The cotton planter is easily drawn by one horse, and may be readily guided and controlled. It may also be lifted over stumps, stones and other obstructions, and turned at the ends of the rows.

The patent is for sale. For terms, address Francis Wesley Key, Staunton, Georgia.



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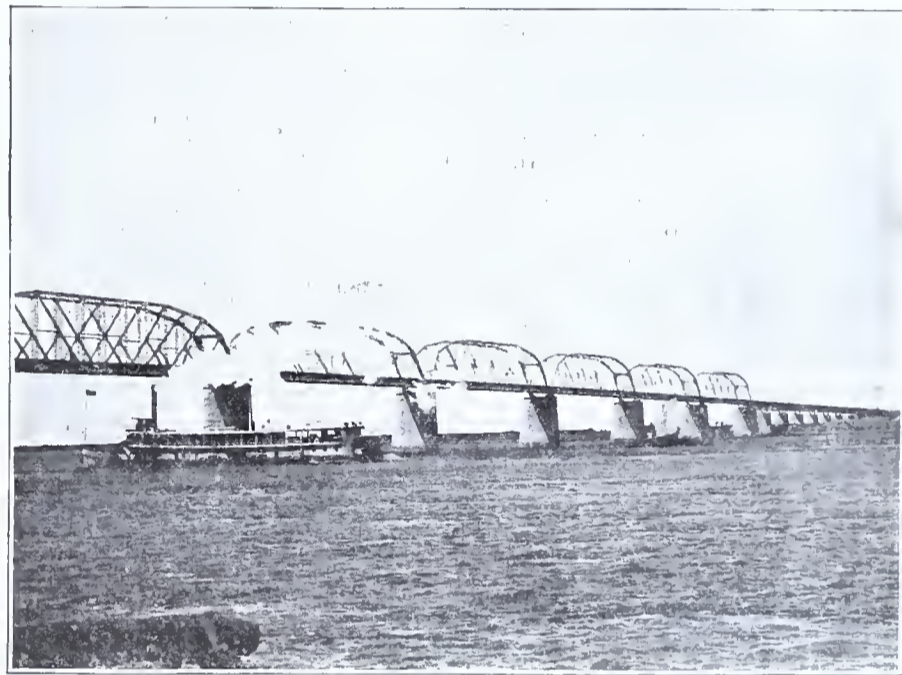
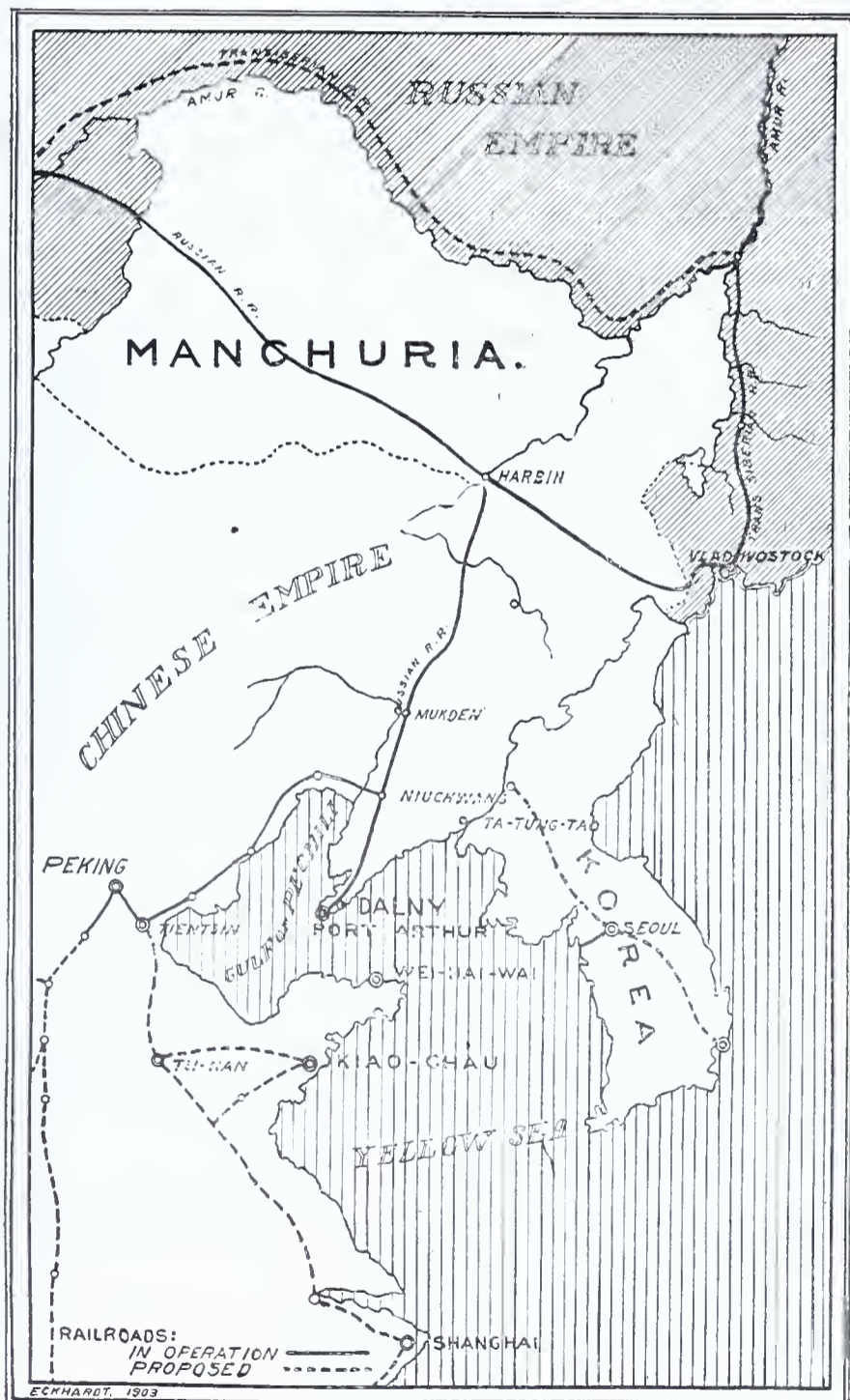
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SIXTEENTH YEAR.
No. 2.

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RUSSIA IN MANCHURIA.



RIVER SUNGARI, HARBIN—RUSSIAN RAILWAY AND RUSSIAN STEAMER.



SIBERIAN TRAIN ENTERING RAILROAD STATION AT HARBIN—
PRESTIN IN THE DISTANCE.

AS we go to press, word comes that Viceroy Alexieff is proceeding to Harbin, Manchuria, with General Pflug, the chief of staff, and the general staff. Already 60,000 Russian troops have arrived at Irkutsk, Siberia, and are in rapid march to Harbin. Since Harbin is destined to be the scene of military operations between Russia and Japan, the eyes of the world are fastened upon her. It will interest our readers to learn something about this city, which her inhabitants proudly call the Moscow of Asia.

In the building of such cities as Vladivostock, Dalny, and Port Arthur,

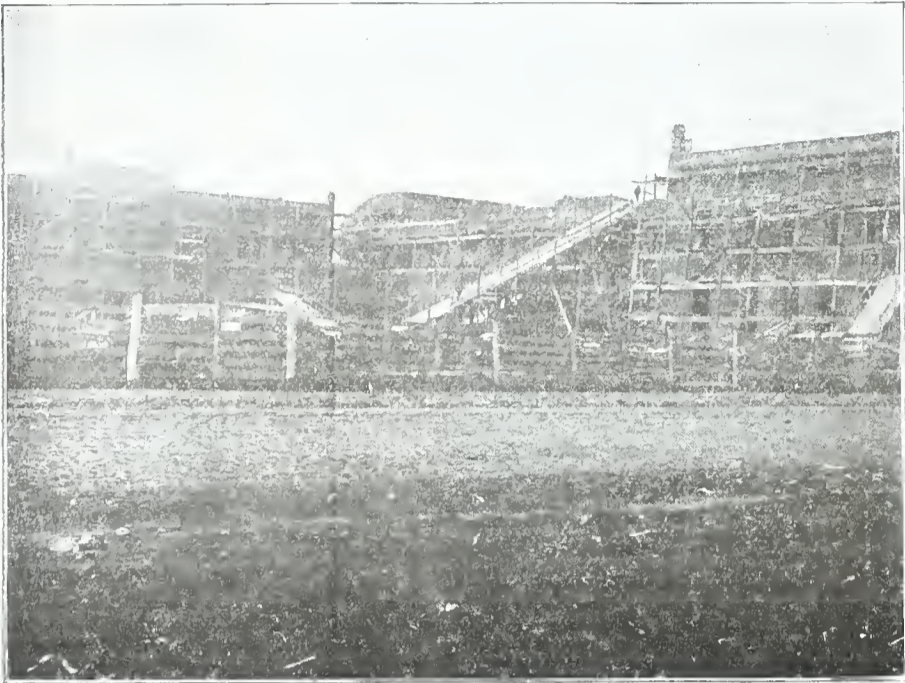
Russia has demonstrated her power and purpose on the Pacific in line with the world's conception of her character: but in the construction of this wonderful city of Harbin, she has displayed an altogether different type of activity from what we are prone to attribute to her. It is in this city more than in all the others combined, that Russia is asserting her intentions of becoming an active industrial force in the affairs of the Orient.

The city is located on the Sungari River, at the point where the Manchurian branch of the Siberian Railway crosses the stream, and where the Chinese

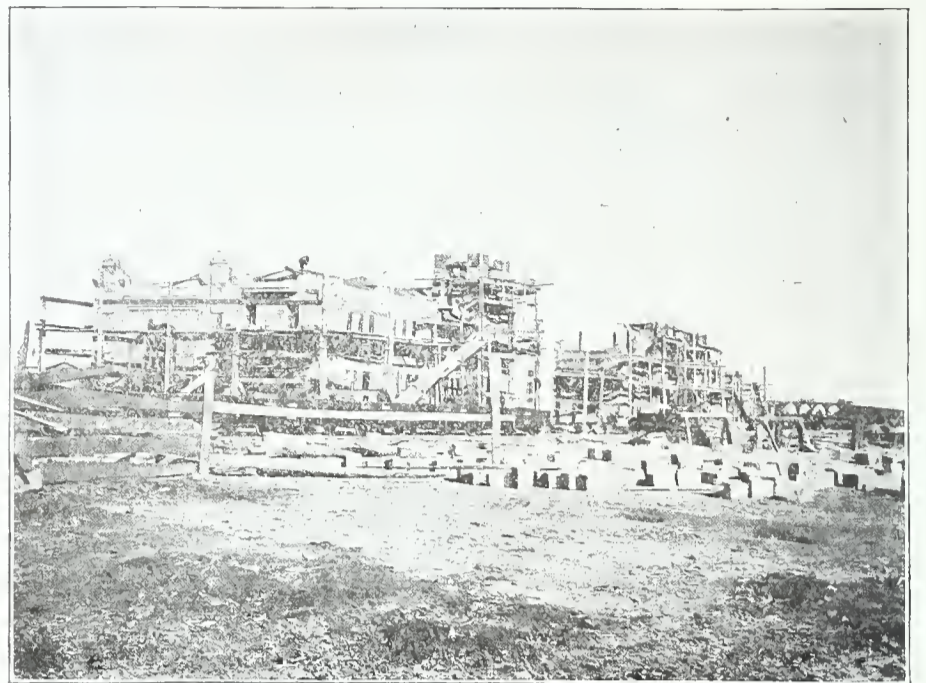
Eastern branch starts south to Dalny and Port Arthur. It is about 350 miles west of Vladivostock and 600 miles north of Port Arthur. Its location is the geographical center of Manchuria, and from present prospects, it is to become the commercial center as well. The city is surrounded on all sides for hundreds of miles with a rich and productive agricultural country, producing corn, wheat, oats, barley, beans, millet, hemp, tobacco, vegetables, and some

various departments. Residences for the employees cover the largest area of this division of this marvelous city.

The following are some of the principal buildings of the administration city: Administration buildings three stories in height, having a total floor space of 176,400 square feet, to cost when finished \$618,000; railway shops, \$1,287,500; hospitals, \$322,390; commercial school and girls' school, \$257,500; technical



SCHOOL OF COMMERCE, HARBIN, OCTOBER, 1903.



RAILROAD HOTEL, HARBIN, OCTOBER, 1903.

fruits. Minerals and timber and great areas of grazing lands also surround it.

At present the place consists of the old town, 3 miles from the central depot: Prestin, or the river town, the present commercial center; and the administration town, in close proximity to the railway station. Before the railway engineers established this as their headquarters, there was no native town in this vicinity, and the entire place is therefore a Russian product.

In 1900 the place began to assume importance as a center of railway management, and in 1901 the population had grown to 12,000 Russians; in 1902, to 20,000; by May, 1903, to 44,000; and in October, 1903, a census showed a population of 60,000, exclusive of soldiers. Of these, 400 are Japanese and 300 of all other nationalities, including Germans, Austrians, Greeks, and Turks. All the rest are Russians. There are no Americans. The railway and administration employees, including families, constitute 11,000 of the population. The Chinese population is about 40,000, located in a special settlement.

Harbin is the center of the entire railway administration of Manchuria, and,

school, \$128,750; eight schools for teaching Russians Chinese and for teaching Chinese Russian \$49,440; club and store for employees, \$190,550; hotel, \$83,945; Russo-Chinese bank \$103,000.

The Sungari River is navigable with light-draft steamers and native craft for nearly 200 miles above the city, up both branches of the river, and much traffic has already developed on these streams, especially in wheat.

From Harbin to the Amur River, during the navigating season, which begins in April and ends November 1, good-sized river steamers run daily. These steamers are well fitted with good, comfortable cabins for first, second, and third class passengers. They carry large cargoes of freight and usually tow barges loaded with freight. The Chinese Eastern Railroad Company and the Amur Steamship Company run good steamers on this line, and there are also several private boats covering the same route. All are loaded continually to their full capacity.

The steamers are mostly of the stern-wheel type, burning wood, such as are in operation on the western rivers in the United States, but none are constructed of American-made machinery. The time usually required to go from Harbin to Harborofsk, at the mouth of the Ussuri River, on the Amur, is five days. At this place these steamers connect with trains for Vladivostock.

Going west from Harbin the train takes you by a branch line from the crossing of the headwaters of the Amur to Stretensk, the head of navigation of this great river, while the main line goes to Lake Baikal (Siberia) and Russia. Going east, the railway reaches the sea at Vladivostock. Going south, the Chinese Eastern Railway meets seagoing ships at Niuchwang, Dalny, and Port Arthur.

In October, 1903, the regular number of trains dispatched for through traffic was thirty per day. Eighteen local trains were dispatched in addition. These local trains connected the two extremes of the town,



BUSINESS BUILDINGS IN PRESTIN.

as the Russian commercial enterprises of the Far East are under the direction of the railway company, it was destined, before the outbreak of hostilities, to be the center of Russian industrial and commercial development. Whether it will survive the shock of warfare, remains to be seen. It is the headquarters of the civil courts and the chief military post, and the main center of control of all the vast army of railway guards. The administration city, therefore, consists of all the public and private buildings and shops necessary for these

viz, the old town and Prestin with the administration part of the city.

INDUSTRIES AND IMPROVEMENTS.

Harbin was started primarily as a military center and an administration town for the government and direction of railway affairs. Its growth into a splendid commercial and manufacturing city was not originally provided for by the promoters, and it has been somewhat of a surprise to them, but the fever of making it a great Russian commercial and manufacturing city

has now taken possession of the railway management, and every system of promotion and protection that can be devised to increase its growth along these lines is being energetically encouraged.

The capital for most of the private enterprises is furnished by Siberian Jews. Chinese are furnishing money for the construction of some of the finest private buildings, such as hotels, store rooms, etc. In the administration part of the city no private buildings of any kind are permitted. Many elegant residences and substantial structures are in course of construction in the additions adjacent to the administration town. A hotel and theater combined was built at a cost of \$30,900 and rented for \$12,875 per annum.

THE RUSSO-CHINESE BANK.

This is the only banking institution in the place, and it has an elegant home in a structure of stone that has a steam-heating and electric-lighting plant of its own. The building cost \$103,000. The business of the bank has increased 30 per cent during the past year, and its daily transactions, exclusive of railway and other Government accounts, amount to \$206,000. The bank makes no loans on realty, but advances from one-third to one-half capital for current substantial business.

INDUSTRIES OF HARBIN.

The leading industry of Harbin is the manufacture of flour. Eight mills are now in operation, all with modern European machinery with one exception, and that is a small one con-

structed with American machinery. Applications have been made and granted for the construction of two more large ones, and by the middle of 1904, 10 mills would have been in operation, producing 902,800 pounds of flour per day. They pay from 30 to 35

mills in Harbin is \$618,000.

In the immediate vicinity of Harbin there are 200 brickmaking plants, the cost of which was \$257,500. Two of these plants were constructed by the administration, at a cost of \$103,000. Most of the brick produced are used



VIEW OF RUSSO CHINESE BANK, HARBIN. OCTOBER, 1903.

cents gold per bushel for their wheat delivered at the mills, and the wheat-producing area can be increased enormously. The present value of the flour

in the construction of the city. A very good grade of red brick is produced and sold for \$3.35 per 1,000. Most of the work is done by Chinese, who are

paid 18 cents per day.

The next industry of importance is the production of the Russian liquor, vodka. There are eight manufactories, constructed at a cost of \$103,000.

There are several companies engaged in the business of meat packing, with plants costing altogether \$128,750. They cure ham, bacon, and all varieties of smoked meats and produce excellent articles. The hogs and cattle in this part of the country are grain fed and make splendid meats, and the Russians are experts in preparing it for markets. So far these concerns have not been able to supply the Manchurian markets, but the cheap labor of the country, in combination with the cheap grain and familiarity of the Chinese with hog raising, makes a good foundation for the growth of the country.

The country is productive in wheat, cattle, sheep, hogs, millet, barley, oats, corn, beans, furs, hides, wool, bristles, bean oil, bean cake, hemp, tobacco, and timber, and has various undeveloped mineral resources: in fact it has all the natural elements for the foundation of a great city.

The chief engineer who was in charge of the construction of the Russian railways in Manchuria, is authority for the statement that Russia had expended in railways in Manchuria \$139,050,000. Add to this her investments in fortifications and in the constructions of the cities of Port Arthur, Dalny, Harbin, and other places and it is a very moderate estimate to place her investments in permanent properties in Manchuria at a total of \$257,500,000.

THE COTTON BOLL WEEVIL PROBLEM.

The President, in his message to Congress, made the following recommendation:

"The cotton growing states have recently been invaded by a weevil that has done much damage and threatens the entire cotton industry. I suggest to the Congress the prompt enactment of such remedial legislation as its judgment may approve."

Congress acted promptly on this recommendation, and on the 15th day of January, 1904, passed an act giving to the Secretary of Agriculture the sum of \$250,000 to meet the emergency caused by the ravages of the Mexican cotton boll weevil, and diseases affecting cotton. Congressman Burleson of Texas was largely instrumental in bringing about the legislation.

The Mexican boll weevil is a beetle, varying in length from three-sixteenths to three-eighths of an inch. He is born hungry and with an hereditary appetite for cotton bolls only, that would drive despair to the heart of the most cheerful agriculturist. In a single night one of the baby weevils will eat an amount of young cotton bolls, or the tenderest parts, that, if permitted to reach maturity would make a bale weighing twenty-seven million times his own weight. He is not an insect of the highest order of intelligence, and when he flies with his rather under-developed wings, does so in an aimless manner and in a straight line, alighting on any other plant that his legs happen to touch first. One of the provisions of nature that has been noted in this pest is that he grows according to the food he has had during his confinement in the larva of his mother, lack of food never injuring him in the least beyond a retarding of his growth entirely disproportionate to his appetite. A half-sized weevil will eat quite as much as his larger brother, or at least will destroy as much cotton, for they will select the tender "squares," or undeveloped bolls, and

never descend to the mature boll unless driven to this course by desperate straits for food.

It is a tropical insect, native to Mexico, Central America, Cuba, and possibly others of the West Indies, and possibly also of the tropical regions of South America. It breeds only on the cotton plant. It damaged cotton plantations in Mexico to such a serious extent that cotton cultivation was abandoned in portions of that country prior in 1890. About 1892 it crossed the Rio Grande River in Cameron, County, Texas, and began to destroy the cotton crop in the vicinity of Brownsville, in said county. The Division of Entomology of the Department of Agriculture began investigating the insect in 1894. An expert of the Department was sent to the locality, and his report, published in 1895, was the first account of the life history of the insect and the damage being wrought by it. When it had been carried across the grazing region between Brownsville and Alice, in Nueces County, in cotton taken to the gins, the insect for the first time entered the region of practically continuous cotton cultivation.

In 1895 it had spread as far north as San Antonio in Bexar County, and as far east as Wharton County. In 1896 it reached the portion of Texas where cotton is very prominent as a crop, and invaded Fayette, Washington, Burleson, Lee, Bastrop, and Travis Counties. In 1898, favorable climatic conditions increased the territory affected to a great extent. Scientific investigations were conducted by the Division of Entomology during these years from the ordinary appropriations of the Division. Congress in the session of 1900-1901 appropriated \$3,500 for an especial study of the insect. In 1902, \$20,000, were appropriated for the same purpose; in 1903, \$30,000. Still the insect multiplied and spread in spite of all efforts on the part of the Department and of the Texas planters, and it is now found in about 100 counties in the Texas cotton belt.

The work of the Division of Entomology based upon an exact and extended investigation of the life history and habits of the insect has proven that it cannot be successfully handled by any insecticide application as yet discovered. No practical mechanical means for its destruction have been devised; no efficient parasitic or predatory natural enemies have been found. It is without doubt the most difficult insect to control which exists within the territory of the United States. The Division of Entomology, however, has devised a cultural method, based upon its previous investigations of the habits and life history of the insect, which will enable Texas planters to grow cotton, it is confidently believed, without loss, and during 1903 a few demonstration farms were carried on under the Congressional appropriation, which have indicated a measure of relief.

During the period from 1902 to 1903, the insect caused a great money loss to the State of Texas. Of actual cotton destroyed, the most conservative estimate places the loss during these years at \$30,000,000, while industries dependent upon the cotton industry or connected therewith have suffered in corresponding degree. It is surely safe to say that there has been lost \$100,000,000 during the past few years by the direct or indirect influence of this weevil. The most serious aspect of the situation lies in the fact that the weevil is constantly spreading, and will undoubtedly eventually be carried all over the cotton belt.

The State of Texas has not been idle in the meantime. Two conventions have been held to consider the situation, which has been gone over very carefully and thoroughly and from every point of view. A cure for the evil, a means of destroying the insect, has not yet been found, in spite of the reward of \$50,000 offered by the State of Texas. Poison which proved so satisfactory in killing off other cotton pests has failed to affect the weevil; and he is superior to the cold. Weevils frozen solid in ice have been found as active and lively as ever when thawed out. The Dallas Boll Weevil Convention, which had over a hundred remedies suggested to it,

would pronounce none of them satisfactory; and while it expressed the hope that a remedy would be found sooner or later, it was after all only a hope.

The Secretary of Agriculture has approved the plans for the cotton boll weevil investigation in the Southwest, for which a special appropriation of \$250,000 has been made available. Secretary Wilson believes that the best methods for meeting the ravages caused by the boll weevil will be to put into actual practice the facts which have been accumulated by the Department during the past two years in the matter of improving cultural conditions, the planting of early maturing varieties of cotton, substitution of other crops, etc.; and it will be interesting to note what effect the plans of the Department will have upon the cotton crop for the year 1904. The high price of cotton at the present time will naturally increase the area of cultivation, but whether the crop will be any greater will depend largely upon the influence of the insect. When it is remembered what ravages the cotton caterpillar made during the first few years of his appearance, and the belief which then prevailed that it would seriously cripple the cotton industry, the farmers should take heart under the unfavorable conditions that now face them, and should look forward to similarly overcoming that even more dangerous enemy, the boll weevil.

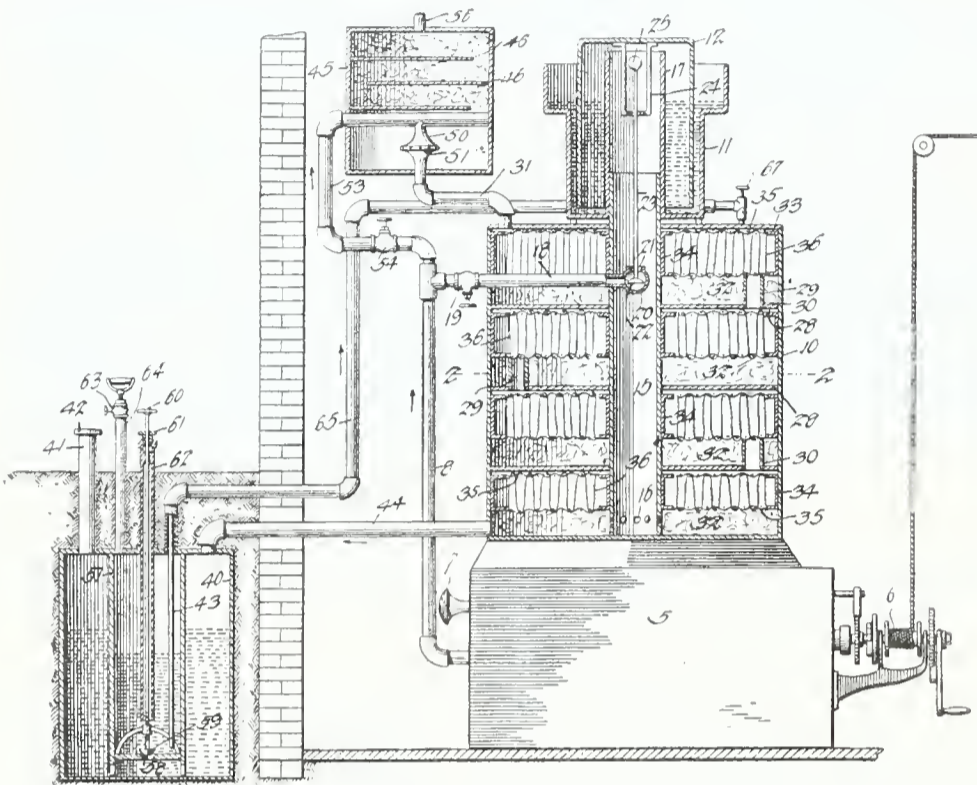
Inventors have not been idle in this respect. Stimulated by the offer from the State of Texas, the Patent Office has been flooded with applications for patents along this line. The favorite plan seems to be to use suction to draw the insects from the plants into a chamber, and then burn them. It is said that some of these plans have been tried with success. It is manifest that the inventor who devises a practical means for destroying the insect, will make his fortune. We believe that some means will be found to accomplish the end desired, for even though the problem is a difficult one, inventors have had apparently insuperable obstacles to confront them before, and have always reached the desired result.

CLEVER NEW PATENTS.

CARBURETER.

A gas making machine that appears to come well within the restrictions of the underwriters has been devised and patented by Mr. John Ruthven, of Chicago, Ill. The invention relates to certain improvements in devices for carbureting air or gas, and has for its principal object to provide an apparatus for the production of a gas of uniform quality and in which the operation will be entirely automatic, the carbureting process ceasing when the gas is cut off at the burner and automatically starting as soon as the gas is ignited.

In connection with the device forming the subject of the present invention any simple mechanism for forcing air or gas under pressure through the carbureting chamber may be used.



The carbureting-chamber 10 is in the form of a vertically-disposed cylindrical tank, which may be mounted on top of the air-pump chamber 5, and at the top of said carbureting-chamber is a tank 11, containing a bell 12, acting as an aerometer, the tank being partially filled with water or other liquid and so arranged as to be acted upon by the pressure of air within the carbureting-tank, so that in the event of the cutting off of the flow of gas from the carbureter, the pressure of air within the tank will raise the bell and automatically cut off the supply of air to the carbureting-chamber.

The carbureting-chamber is provided with a centrally-disposed vertical tube 15, provided at its lower end with slots 16 and its upper end extending into the lower portion of a tubular member 17, forming part of the aerometer-tank. The main air-pipe 8 is connected to a horizontally-disposed pipe 18, having a controlling-valve 19, which may be employed to regulate the quantity of air admitted, or to entirely cut-off the supply, said pipe extending within the tube 15 and terminating in a valve-chamber 20, having a port 21, opening into the tube 15. In the valve-chamber is a valve 22, held on the lower end of the valve-stem 23, the upper end of which is guided within a yoke 24, carried by the gas-valve, and at the upper portion of the valve-rod is an enlarged head 25, which is engaged by the yoke when the air-bell rises to a predetermined height, and in raising, the valve-stem cuts off the flow of air into the carbureting-chamber. The carbureting-chamber is divided by horizontal partitions 28 into a number of superposed chambers, and in each partition is an opening for the reception of a vertical tube 29, open at top and bottom and preferably provided with a number of drainage-openings 30 to permit the passage of liquid hydrocarbon by gravity from chamber to chamber. The tubes 29 are arranged in staggered relation, being disposed alternatively on opposite sides of the tube 15, so as to form a tortuous passage for the air being carbureted, the air entering through the tube 15 being forced through the opening 16 at the lower end of the tube and thence passing through the several chambers as indicated by the arrows and escaping from the carbureting chamber through a discharge-pipe 31.

The tubes 29 are approximately about one-half the vertical height of the several chambers, and in the space around the tubes, extending up to the tops thereof, the chambers are filled with fibrous material, such as cotton, for the absorption of gasoline or other hydrocarbon, the cotton being indicated at 32, and in the space between the top of the absorbent material and top of each chamber is placed a cage.

At a convenient point, preferably underground, is placed a storage-tank 40, to which gasoline or other hydrocarbon may be supplied through a filling-pipe 41, having a removable cap 42.

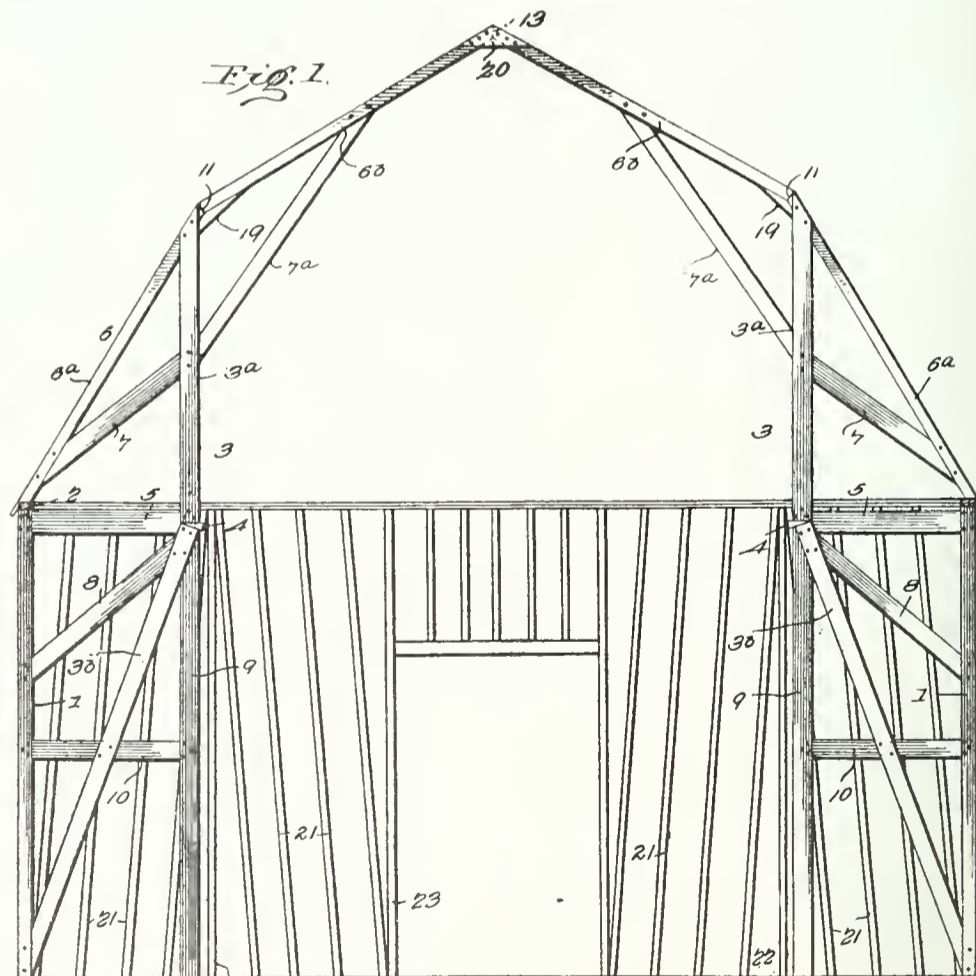
In the passage of the air through the several superposed chambers it comes into contact with the saturated wicking and absorbs a sufficient quantity of hydrocarbon to form an explosive or burning mixture; but in some cases this mixture will be too rich in carbon to form a vapor suitable for use with some classes of burners, especially those using incandescent candles, and to reduce or dilute the vapor there is employed a filtering-chamber provided with a number of horizontally-disposed partitions, extending alternately from opposite sides of the chamber and forming a plurality of shelves for the reception and support of a fibrous straining material of suitable character, the partitions terminating short of the walls of the chamber, so as to form a tortuous passage for the gas and air.

BARN.

Those farmers who wish to build a barn on scientific principles and having a maximum amount of strength and capacity at a minimum cost of construction, should consult with Messrs. John Scheidler and John N. Neal, of Coldwater, Michigan, and investigate the invention patented by them on such a structure. The invention itself is the work of Mr. Scheidler, and Mr. Neal has obtained control of a one-half interest in the patent. Mr. Scheidler thus describes his invention.

I employ the usual end and side sills. From the side sills rise the vertical studs 1, on the upper ends of which are secured the plates 2. The hips of the roof are supported by upright trusses 3, each of which comprises an upper section 3a, disposed in a vertical position, and a lower section 3b, disposed in an inclined position, with its lower end secured to the lower end of one of the studs 1. Between the meeting ends of the said sections 3a 3b is driven a wedge-shaped key 4. The upright truss 3 is connected to the upper end of the stud 1 by a horizontally-disposed tie 5, which is nailed or spiked to the said stud and to the lower end of the section 3a and the upper end of the section 3b of the said truss. The upper section 3a is connected to one of the rafters 6 by a tie 7, which is preferably disposed in an inclined position, as shown. The lower section 3b of the truss is connected to the stud 1 at a point intermediate its length by a tie 8, which is also preferably inclined. I employ a vertical strut 9 in connection with the truss, the said strut being disposed in line with the vertical upper section of the truss and secured to the upper end of the lower section of the truss by nails or other suitable means. The lower section of the truss, together with the said strut, is connected to the stud 1 by a tie 10, which is here shown as disposed in a horizontal position. It will be understood that the upright truss braces the side of the barn against lateral displacement from within, whereby a building constructed in accordance with my invention is effectually prevented from having its sides and ends bulged outwardly by the weight of the grain or other contents thereof.

Each of the rafters 6 is composed of a lower section 6a and an upper section 6b. The same have their meeting ends partially cut on the angles 11 required by the roof and partially cut at right angles, as at 12. The right-angled portions of the meeting ends of the rafter-sections are at the outer or upper sides of said rafter-sections. The upper ends of the upper rafter-sections are cut on the required angles 13. Prior to raising each rafter, the sections thereof are disposed end for end in the same plane, and are connected together by wires 14, which are embedded in the upper sides of the rafter-sections, are of suitable length, and are secured thereto by staples 15 at the ends of the said wires and nails or spikes 16 in eyes 17, formed in the wires at points intermediate their ends. A pin or other suitable metallic strip or plate 18 overlaps the meeting ends of the rafter-sections on their upper sides and is disposed under the tie-wires. When the sections of the rafter have been thus secured together, the rafter is bent to close the ends 11 of its sections together and open the portions 12, thereby stretching the tie-wires 14 and tightening them to the maximum extent, and a gambrel-block 19 is then secured on the under side of the rafter at the angle thereof.



In order to strengthen the construction of the sides and ends of the barn to prevent the same from being racked and twisted by the winds, I incline the studs 21 between the vertical corner-studs 1 and the vertical intermediate studs 22 and door-posts 23, the inclined studs 21 in each bay or space between a corner and a stud or post 23 inclining in opposite directions, thus bracing a side or end of the barn in both directions longitudinally thereof.

The pressure in a barn of this character is upward and outward upon the hips of the roof, especially when heavy downward pressure is brought upon the ridge of the roof, as when hoisting hay or grain when unloading a wagon driven into the barn. In order to further strengthen the construction of the roof at the hips, I employ ties 7a, which are connected to the upper vertical sections 3a of the trusses and the upper sections 6b of the rafters.

EXPERIMENTS IN RADIUM.

Radium continues to be the most interesting subject in the scientific world. The mystery that envelops its nature, so far from yielding to the earnest research that is being so widely conducted, seems to grow daily deeper, more inexplicable. It is nothing short of a sensation, and everything that pertains to the new element is a matter of conjecture. Sir William Ramsay, one of the best known scientists of Europe, recently made the startling announcement, in an address before the London Institute, that he had discovered that radium had the power of changing, by some subtle process, into another metal, helium. This would seem to involve the transmutation of elements, and to realize the dreams of the alchemists of old. Before accepting this conclusion, however, which would shake the very foundations of the science of chemistry, trained men assert that it will be necessary to prove that radium is an element at all. Too little is known of it to warrant any generalizations. It may be merely a highly complex and very unstable compound, of which helium is one of the constituents. Or, radium and helium may be different manifestations of one element. Whatever explanation may be given of the phenomenon, other properties have developed that are no less interesting. The Nobel prize for scientific discovery for 1903 was awarded to Prof. and Madame Curie, to whom belongs the distinction of having isolated the new element—if so it may be called. Thomas A. Edison has declared that "the most important development of the coming year will be radium." Prof. Curie himself thinks that its most valuable application will be in the field of medicine. A physician with a tenth of a grain of radium could receive an unlimited number of cases he declares, and effect cure after cure of lupus, and above all, of cancerous affections. It has been found of value in the treatment of the "white death"—consumption—that slays as many people annually, in northern climates, as the plague does in the infected cities of the East. It is possible for the emanations from radium to be inhaled into the lungs, with excellent results. The rays have, in fact, a generally germicidal action. It is true that the hope that it might be found to restore sight to the blind has not so far been realized. A particle of radium, inclosed in a box and placed on the forehead, conveys a sensation of light to the eye, but it does not enable the blind person to distinguish objects. So far, however, according to Prof. Curie, only radium salts have been used in experiments, and these in minute quantities, so that it is impossible to forecast the result of the use of the pure product.

In spite of the eager search for sources of supply of radium, none has so far been found outside the original deposits in Bohemia, and the price, already fabulous, has advanced still further. The knowledge that relatively worthless deposits of pitch-

blende might be found to contain the most valuable element known has caused investigation in all parts of the world. Supplies of pitchblende in several of the states have been examined, but the only reliable source, as stated, is in mines in Bohemia and the supply has been sadly curtailed by the action of the Austrian government in refusing to allow further export. The result is that radium is now quoted at the purely theoretical price of \$60,000,000 per pound. It is not likely that it will be widely applied, in view of this circumstance.

Radium might be a factor in warfare, by producing explosions in a magazine, causing the disappearance of the ship and the ship's entire company. It is also dangerous to bring a tenth grain in contact with a charged electric battery, as it would occasion an immediate explosion. But as a rule, it is dangerous to individuals rather than to objects. A very small portion, enclosed in a tube, causes the destruction of the skin if left in contact with it. Most inconsistent results have followed experiments in regard to the effect of the new element on animal life. A tube containing radium, left for 24 hours in contact with the skin of a guinea pig, causes the complete destruction of the epidermis; but a contact of 48 hours makes the wound no deeper, and the flesh and muscular tissue beneath do not seem to be affected. A rabbit, on the other hand, does not seem to be as sensitive to the radium rays. Applications that produce painful sores on the skins of guinea pigs only act as stimulants or irritants to the skin of rabbits—causing, singularly enough, a prolific growth of hair. This would certainly appeal to the manufacturers of hair restorers for application to the human scalp, were it not for the unfortunate fact that the growth of hair caused by the radium rays is invariably snow white in color. Application of radium to the spinal cord of many animals causes lockjaw, paralysis and death. As a general rule, it may be stated that while the intestinal organs of animals are only slightly sensitive to the effects of radium, the nervous centres are extremely responsive. It would therefore prove a most dangerous medium in causing crime, if it ever became obtainable, as it would defy detection.

THE N-RAYS.

The investigation of the wonderful properties of radium has so absorbed the scientific press that other subjects of almost equal interest have been to an extent neglected. The recent discovery of a new form of radio-activity which is called the N-Ray, (until something definite can be known about it and it can be distinguished by some characteristic appellation,) would have been greeted as one of the greatest works of the age, had it not been for the overshadowing interest attaching to radium. The N-Rays appear to form a connecting link between the ordinary phenomena of

light and the remarkable effects of radio-activity which have so startled investigators of late. According to a scientific authority, "A linkage of this sort is invaluable in preparing for generalization the great mass of experimental data that has been accumulated. The study of N-Rays has opened a new field of scientific investigation which seems likely to yield important results." The rays have the effect of rendering a small electric spark more luminous. They exert the same effect upon a flame: and the discoverer declares that it is not essential for the rays to fall upon an object to render it more visible, but the same effect is obtained if they penetrate the eye. These rays are given out from various luminous objects as well as from objects that have been exposed to sunlight. M. Blondlet, the discoverer, had his eye fixed on a small, feebly illuminated band of paper. A brick which had been exposed to sunlight was brought near his face, with the exposed surface toward him. He at once saw the paper brighten, and the effect disappeared on removing the brick, or on turning the other side toward his face. It was not affected by enclosing the brick in a box closed with black paper.

If a room is darkened until the face of a clock on the wall is only faintly visible, and a solarized brick or pebble is brought near the eye, the face of the clock at once becomes clearly outlined, and in some cases the hands are seen. No explanation is offered of this curious phenomenon.

Reducing Danger Risks in Tunnels.

The recent dreadful loss of life on the Paris underground railway, owing to the sudden extinction of all light in the tunnels, has brought forth a large number of proposals for the safeguarding of life there in future. One suggestion is to paint the walls of the tunnels with luminous paint, or insert at certain distances apart phosphorescent plaques in the walls of the tunnel, putting a luminous border round the exits under ground, and so on. The material they propose to use is monosulphate of calcium, a mixture of sulphur and calcined oyster shells, or cuttle fish bones.

Electric Shocks from Fire Streams.

One of the objections to the erection of electric wires on poles in cities is the hindrance which such wires offer to free access to a burning building by means of ladders and fire towers. It is at times also necessary to cut such wires to afford access to a burning building,—a work which is not highly appreciated by the fire fighters. Another difficulty presents itself also, namely, the danger to the firemen from electric shocks due to currents carried to the nozzle by the stream of water when it comes in contact with live wires. Such shocks have more than once been of sufficient strength to disable firemen for a time, but, so far as is known, no fatalities due to this cause have occurred. In order to ascertain to what extent firemen are subject to risk of life, if at all, when the stream of water thrown from the hose strikes against live wires, a series of experiments were recently undertaken in Germany. They were made with pressures of 6000 volts alternating current, and 550 volts direct current. The stream of water was directed against a portion of the wires from which the insulation had been previously removed. With the 6000 volts pressure it was found that the resistance of about one foot of ordinary hydrant water reduced the potential of the current to a point when it was not dangerous, but the effects were not pleasant. When the resistance of the water was lowered by the addition of .05 per cent. of soda, the minimum safe length of the stream was increased to about 40 inches. With 550 volts direct-current a dangerous voltage was not reached with pure hydrant water, but with the same percentage of soda in the water harmful potentials were indicated by the volt-meters used in the tests when the stream of water was only 3 inches long. On the whole the results of the experiments showed that the danger to firemen from the contact of water from the hose with live wires carrying high potentials is not ordinarily so great as has been generally supposed hitherto. This, however, is no reason for lessening the precautions looking to the safety and best interests of all concerned in this matter.—*Cassier's Magazine.*

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MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been procured through the Patent Soliciting Office of E. G. Siggers, Patent Lawyer, Washington, D. C.

Nils S. Emert, Omaha, Nebraska. **Permutation Lock for Valises, Bags, etc.**—The permutation lock of this patent is not only simple and inexpensive in construction, but possesses great strength and durability, and is capable of effectually preventing a valise, bag, satchel, or the like from being surreptitiously opened. It is composed of a casing mounted on one side of a bag or valise in the ordinary manner and provided with slots or openings to receive the engaging portion of a hasp, which is mounted on the other side of the bag or valise. Within the casing is arranged a series of tumblers, which are adapted to engage and release a sliding bolt. The tumblers are provided with exteriorly arranged graduated operating buttons or knobs, which are located at opposite sides of a button or knob that is connected with the bolt. The buttons or knobs of the tumbler rotate, while that of the sliding bolt is fixed to the same.

Samuel Walter, Dallas City, Ills. **Washing Machine.**—Mr. Walter has invented an ingenious machine, which will permit the operator to stand at one side of it in a natural and easy position without bending over. It comprises a tub having a hinged lid, a rubber carried by the lid, an upstanding operating lever arranged at one side of the machine, and mechanism also mounted on the lid and arranged to be automatically disconnected from the lever when the lid is opened, and similarly engaged with the lever when the lid is closed. The machine is also provided with means for automatically throwing the lever to the rearward limit of its movement when the lid is opened.

Sidney Anson, Toledo, Ohio. **Sawing Machine.**—It is the aim of the present invention to improve the construction of foot operated sawing machines, and to enable the bearings of the drive shaft to form stops for preventing the carriage from striking the crank. The frame of the machine is provided with a track, extending rearward from its front end and receiving a reciprocating carriage. The saw shaft is arranged at the front of the machine below the plane of the carriage, and the drive shaft is disposed at the back of the frame in bearings, which are arranged in the path of the carriage. The carriage is limited in its rearward movement by these bearings, and is thereby prevented from coming in contact with the crank of the drive shaft.

Marion F. and Joseph H. Seward, Elmendorf, Texas. **Cotton Feeder and Cleaner.**—This patent discloses a cotton feeder and cleaner for feeding cotton to the gin and for effectually cleaning the cotton during its transit. It is designed to be interposed between the chute or vacuum boxes and the gin, and to supply the latter with a uniform quantity of thoroughly clean cotton. Below the lower end of the chute is disposed a carrier, arranged to convey the cotton horizontally away from the plane of the chute to an interval between one end of the carrier and a condensing roll. The cotton, which is spread over the carrier in a uniform sheet, is carried to, and condensed within the interval above described, and from this interval the cotton is drawn down in uniform quantities by a cleaning cylinder

which carries it over the face of a concave screen and finally delivers it to a second cylinder, which, after effecting the further cleaning of the cotton, discharges it through the discharge chute of the feeder to the gin. At the bottom of the casing is a conveyor for carrying off the debris discharged through the screen, and for the purpose of permitting access for the cleaning and repair of the apparatus, the latter is provided with a door and one of the screens is arranged to swing down. The invention marks a distinct advance in the art, and will undoubtedly prove of interest to the cotton industry.

Amos G. Cox, inventor; Winterville, North Carolina; Rowan Cooper and A. G. Cox Manufacturing Company, assignees, same place. **Truck**—An important improvement in the draft mechanism of trucks is effected by the present invention, which distributes the draft between the body of the truck and the front axle, and at the same time, does not interfere with the turning of the truck, but permits the front axle to be turned quickly in any direction. The invention resides essentially in the particular construction and arrangement of the draw bar, which is composed of upper and lower members disposed in the same vertical plane. The lower member is rigidly connected with the axle at a point between the wheels, and the upper member is secured to the platform by the pivot of the axle, and is movable with the lower member. The platform of the truck is provided with a depending bolster, to which is fixed a disk; and the front axle is provided at its center with a corresponding disk, which fits against that of the bolster. The king bolt passes through the platform, the bolster and the disks.

Willie A. Hammer, inventor; Crockett Mills, Tennessee; William T. Curtsinger and Francis M. Hogancamp, assignees, same place. **Combined Stump Puller and Tree Transplanter.**—The present invention provides a simply constructed, thoroughly effective, cheap, durable and readily operable apparatus, which may be easily transported from point to point, and with readiness and ease be changed from a stump puller to a tree transplanter, and vice versa. The apparatus comprises opposite sills, upright guides rising from the sills, a lifting beam movable between the guides, inclined corner braces between the sills and the upright guides, a substantially horizontal frame provided with a tongue and connected to the upright guides and the front braces, and whiffletrees connected with the front ends of the sills.

When the apparatus is used as a stump puller, it is driven to the field and over the stump. The lifting beam is then lowered through the agency of cranks, and its chains are attached to the stump. The beam is then elevated until the chains are taut, and the jacks are operated to force the beam upward to extract the stump. When the apparatus is used as a tree transplanter, cross beams at the rear of the structure are removed to enable it to be backed up until the lifting beam engages the tree.

William C. Modisett, Green Bay, Wis. **Pen Holder.**—The invention covered by this patent relates to that class of pen holders constructed so that the pen may be released without grasping the same, thereby avoiding the soiling of the fingers. The handle or stem of the holder is provided at one end with a reduced terminal portion or shank having outstanding longitudinally disposed flanges. A sleeve is rotatably mounted on the handle and carries a forwardly projecting hood that coacts with the flanges and forms between them an ordinary shank or pen-receiving socket.

A pen placed in this socket is securely held in position, but when worn out or broken, can be easily released by simply revolving the sleeve, thus bringing the sleeve into position on the opposite side of the shank to form another socket into which a new pen may be introduced.

William R. Evans, Eagleville, Mo. **Animal Poke.**—This is perhaps the simplest device of this character ever invented, and for the same reason must be classed as one of the most efficient. A pair of members are employed comprising flat-sided metallic bars, each having a stop arm at one end, a horizontally extending prod at the other end, and an intermediate hinged yoke portion located between the arm and prod. The members are reversed and are adapted to be placed with the yoke portions embracing the neck of the animal, being secured together by bolts, and thus providing upper and lower rearwardly projecting prods and upper and lower forwardly extending stop hooks.

Louis E. Olson, Brooklyn, New York. **Addressing Machine.**—In Mr. Olson's patent is shown an extremely simple and highly efficient addressing machine which involves means for automatically feeding a mailing strip, and for pasting, cutting and applying to envelopes the individual address labels of which the strip is composed. The machine involves in its organization means for effecting the automatic feed of the mailing strip either regular or irregular distances according to the widths of the individual address labels, cutting mechanism for severing the labels as the latter are successfully presented in position for application to either a newspaper wrapper or an envelop, and mechanism for evenly distributing adhesive material upon the undersides of the labels immediately prior to their detachment from the strip. In addition to these mechanisms for feeding, cutting and pasting the labels, the machine includes a mirror in which the reflected image of the label located below the cutter may be observed by the operator for the purpose of enabling him to regulate the feed of the mailing strip in accordance with the dimensions of the individual labels. The machine is so arranged that it may be transported from place to place and operated as to all of its functions without the use of more than one hand, the operator's other hand being left available for the manipulation of the wrappers or envelopes to which the labels are being applied. Mr. Olson's invention is manifestly a marked practical advance in the art and will undoubtedly prove a commercial success.

Ira F. Gilmore, Bloomington, Ill. **Two patents. Wireless Pianos.**—The last patents issued to Mr. Gilmore relate to wireless pianos of the type shown in certain earlier patents secured by him, notably No. 699,848. One of the recent patents discloses a piano case in which is mounted a pair of independently movable sound boxes, to one of which is attached the bass reeds and to the other of which the treble reeds are secured. The reeds are arranged to be vibrated by keys carrying pickers at their rear ends, and the engagement of the pickers and reeds is regulated by the adjustment of the sound boards which thus serve to vary the volume of tone. In addition to the reeds, the keys are arranged to operate xylophone hammers which strike a series of xylophone bars, it being possible to throw the xylophone into and out of operation, as desired. It is possible also to secure a mandolin effect by the vibration of the reeds in contact with a series of metal strips, and for the purpose of producing sympathetic sounds tending to pro-

long and increase the volume of tone a number of coiled bells are mounted in the sound boxes or boards and are tuned to accord with the reeds and xylophone. This patent also embraces a series of minor features designed to regulate the volume of sound, and to move the xylophone, mandolin and bell attachments into and out of service.

The other patent utilizes forks in lieu of reeds, and these forks instead of being vibrated by pickers are struck by key-operated hammers. The mechanism for adjusting the various parts is accordingly improved, and the bearings or connections between the keys and the fork and xylophone hammers are made substantially anti-frictional by means of rollers.

Benjamin W. Kindig, Jr., Lebanon, Pa., inventor; Thomas I. Welsh, York, Pa., assignee. **Four patents.** Mr. Kindig, a practical horse dealer and trainer formerly of York, Pa., has recently obtained four patents for several ingenious bridles. The first is intended to facilitate the absolute control of what is known as a pulling horse, the object of the invention being to provide the bridle with a bit which, while being exceedingly severe, will nevertheless be incapable of injuring the horse's mouth. The overdraw bit is provided with a pair of guide rings, and a flexible bit of leather, chain, or the like is looped around the lower jaw of the animal and crossed in his mouth, the ends of the flexible bit being connected directly to the reins. Under ordinary conditions, the loop bit will not be severely restricted around the horse's jaw, but should greater severity be demanded, an exaggerated pull on the reins will draw the ends of the bit through the guide rings of the overdraw bit, thus constricting the flexible loop bit around the jaw of the animal with such force as may be necessary to secure his complete control. The presence of the overdraw bit between the teeth will prevent the animal from gripping the flexible bit or from chewing the latter.

Another patent discloses a further development of the invention above described, the improvement consisting in constructing the overdraw bit with fixed guide rings and in providing said bit with an ingenious arrangement of loops for the attachment of the various straps of the bridle.

The third patent is for a combination bit designed for connection to both the overdraw and the lines or reins. This bit comprises a straight overdraw bit and a curved line bit, the two bits being connected by a universal joint at their middle portions and lying one over the other. This bit insures the complete control of the animal since he cannot possibly clamp the same between his teeth. At the same time injury to his mouth is prevented, and the strain usually exerted upon the cheeks of the animal is avoided.

The fourth patent discloses a head controller for race horses. It is well understood that when a horse is in his stride and going smoothly, his head must be checked up to prevent him from breaking, since it is impossible for a horse with a free head to keep his stride when going at top speed. When a horse breaks or loses his stride, the head is thrown involuntarily either upward or downward interfering materially with the recovery. By means of this controller, the head of the animal is held securely in its natural position thus serving to steady his gait and to minimize the tendency to break, and furthermore to permit quick recovery if, under the stress of an extraordinary effort, the animal loses his stride. The device comprises a controller frame held on the horse's muzzle by jaw, chin and nose straps, and to this frame the overdraw and martingale respectively are attached in a manner to resist the movement of the animal's head either up or down.



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WASHINGTON, FEBRUARY, 1904.

The Report of the Commissioner of Patents.

The report of the Commissioner of Patents for the year ending December 31, 1903, is very interesting to anyone who desires to keep in close touch with the development of patented property. As stated by the Commissioner, "one cannot look at the progress of the Patent Office, since its present system of work was inaugurated by the Act of July 4, 1836, without seeing that it has followed closely the development of the industrial arts in this country during all of this period; and it should require no extended argument to show that the system, which has accomplished these results without expense to the Government, but which has, on the contrary, furnished a net balance of \$5,682,540.61, should be furnished with all necessary facilities in the way of room and employees, so as to permit its future progress in the same measure as the expected growth of the arts in this country."

The Commissioner then points out that in four years the average increase in business, as shown by the receipts, expenditures, applications filed, issues and copies of patents, and records furnished, is 23 per cent; yet this extra work has been accomplished with an increase of only 8 per cent in the number of employees.

As has already been stated in the AGE, the business transacted by the Patent Office during the year 1903 exceeded all previous records, notwithstanding which the work has been transacted as well as could be expected in view of the force employed, and the volume of the work. There is every reason to expect that the increase in the last few years will be maintained to some extent in the current year, which makes it evident that the force of employees is, and will continue to be, inadequate to keep up with the work. On December 31, 1903, there were over 10,000 applications awaiting official action. While it seems to be

the policy of the Office in many Divisions to act on new cases ahead of amended applications, which has resulted in making it possible for new cases to receive action within one month from the date of filing, this has resulted in the consideration of amended cases being delayed for two or three months in some instances. Every one practicing before the Patent Office knows that there is delay in the transaction of work before the Patent Office, while the haste in the execution of the work is shown by the official actions received in many instances, all of which point to the imperative necessity for more employees.

The Commissioner, during last summer, took a trip abroad and was shown plans for buildings by the German Government for its Patent Office, intended to provide accommodations for 2,000 employees. It was stated to him that such accommodation would probably suffice for their necessities until the year 1920. The United States Patent Office is so crowded for room that many of the Divisions are huddled together with six and eight employees in one room. The Commissioner very pointedly says: "The annual issue of patents by the German Government is about six thousand, while the issue for the year 1903 by the American Patent Office was over 31,000. It is to be hoped that Americans will not be obliged to look to Germany at any time in the next decade to see the best embodiment in practice of the system of issuance of patents upon preliminary examinations. If they have concluded that this system, originated by us, lies so close to the national welfare that they have decided to make great expenditures to possess themselves of its benefits, funds should not be wanting in this country to keep our system up to its present position of pre-eminence. At the present time the space provided for the Patent Office is inadequate, and it is very desirable that some plan looking to an extension of working room for the Patent Office shall be adopted without delay, since the present space will be insupportably crowded at the present rate of increase before any new building could be built to contain this Office. Our necessities are growing, while there seems to be as yet no plan for our relief in this regard. The matter is of the utmost concern to all friends of the patent system, and nothing but action in the direction of larger accommodation will save the work of this Office from difficulties plainly apparent and not far ahead in point of time. This subject is of such transcendent importance to this Bureau that I respectfully urge your earnest attention to it."

The INVENTIVE AGE commends this report to its readers and calls on all inventors and friends of the patent system to demand of their Representatives in Washington some relief for the present condition. The Patent Office needs two things: first, it requires a new building giving adequate room for the transaction of business, permitting files and papers and valuable records to be housed in fire-proof vaults where they will be safe from the ravages of the fire fiend, and up-to-date facilities for handling business; secondly, it needs an immediate increase in the force of examiners, and a constant yearly increase in the examining corps to keep pace with the increase of business in the Patent Office.

This is an old story, but it cannot be told too often, because it is a crying need, and no let-up should be had until the result hoped for has been realized.

The New Australian Patent Law.

The Parliament of Federated Australia, comprising the states of New South Wales, Victoria, Queensland, South Australia, West Australia and Tasmania, has passed a patent act, whose commencement is to be fixed hereafter by proclamation, which is intended to cover by a single patent the several states mentioned, instead of, as at present, requiring six patents, each costing as much as the single patent under the new law. The subject has been broached off and on for years, but it is now only a question of time when the new law will go into effect, which is a matter of congratulation among patent lawyers, for there is no doubt that it will result in increased business in patents for Australia. The greatest barrier to obtaining patent protection in Australia has been the expense of six patents, for only in exceptional cases could an inventor afford to protect himself in that country by the filing of six different applications. The law, however, has not been changed as to trade-marks, designs and copyrights. These will be made the subject of further legislation. For some time, therefore, it will be necessary to take independent steps for their protection in each of the federal states.

It has been arranged that existing patents, which have been taken out in any of the several states, may be converted into a commonwealth patent for the remainder or other parts of the territory, and for a period not exceeding the unexpired term of the State Patent.

The provisions of the Australian law show that the patent act of England has been copied from to a very considerable extent. For instance, an examination system has been put in practice, and the Patent Examiner is required to report first, whether the invention is already patented in the Commonwealth, or in any state, or is already the subject of any prior application for a patent; and second, whether the invention is or is not novel. If prior patents are discovered and they are cited against the application, and the applicant still thinks his invention is patentable, the Patent Office will issue the patent on condition that a reference to such prior patents be made in the patent to be issued, by way of notice to the public. It is provided, however, that no prior patent, or a prior application for a patent, or a prior description granted, made or published more than 50 years before the making of an application for patent, shall be cited against or bar the granting of a patent applied for, or affect the validity of a patent when granted, unless it is shown that the invention described or specified in the prior patent, application or description has been used in Australia within 50 years of the date of the acceptance of the application.

One point in which the law differs from that of England is that where the complete specification contains two or more claims in respect of the invention, the validity of any one claim shall not affect the validity of any other claim or the validity of the patent, so far as it relates to any valid claim. This is as it ought to be, and

is in accordance with the practice prevailing in the United States, where an invalid claim may if desired be removed from a patent by a disclaimer. In England, however, the presence of an invalid claim vitiates the entire patent.

The Australian law contains substantially the same provisions that the English patent law does, concerning the granting of compulsory licenses, where it appears that, after the expiration of two years from the granting of a patent, the reasonable requirements of the public with respect to the patented invention have not been satisfied. In this way a patentee cannot hold onto his patent and not work it. In the United States a patentee can take out a patent, and do nothing further with it. In this respect the law is different from that of every other country. Nearly every country where patents are granted requires some act on the part of a patentee to keep his patent in force, or to satisfy the reasonable requirements of the public in the manufacture and sale of the invention, failure to do which permits any person to apply for a license.

It is strongly contended that some such provision should be made a part of the patent law of this country. It is very often the case that an inventor takes out a patent on an invention which is absolutely worthless, and because of some claim therein, he is able to hold up others who have followed him and made the invention practicable. If the United States law required the first-named party to give a license to the latter, progress in many arts would not be so seriously hampered.

As before stated, the Federal Patent Act of Australia has not been put into effect, but it is believed that it is only a question of a few weeks when the law will be made operative, so that applicants for patents in Australia may have their inventions protected by a single patent.

A Prize for Inventors.

The Seri-Culture & Manufacturing Company, of Tallulah Lodge, Ga., has advertised that it will pay \$1,000 cash to the first person who will invent a reeling machine for the unwinding of silk cocoons, which will do the work practically and successfully in a manner superior to any reeling machine now in use. The said company will also purchase the patent for the invention on satisfactory terms.

The inventor who can produce such a machine is accordingly assured of a good reward for his efforts.

Those interested should write Louis B. Magid, Editor of a paper called "SILK," and President of the Seri-Culture & Manufacturing Company, Tallulah Lodge, Ga.

The patent records reached the three-quarter-million mark January 19, 1904 when the patents granted numbered 750,244. The particular patent numbered 750,000 covers a rubber vehicle tire invented by Mr. Eugene McArdle of New York city. The present series of patents began in 1836 and it required forty-six years to complete the first quarter-million, twelve years for the second and ten years for the third and last. This will indicate the great strides with which the patent business of this country has grown, and if the rate of increase continues, the time will be comparatively short when the million mark will be passed.

SCIENTIFIC

PROGRESS.

Manufacture of Iron and Steel.

Certain new and useful improvements in the manufacture of iron or steel by electrometallurgy have been invented by Mr. Henri Harmet, of St. Etienne, France, who has obtained a patent in this country on said improvements.

In carrying out the invention, a blast-furnace is provided for the reduction and fusion of iron-ores. This furnace may be any desired size. The source of heat is furnished by an electric current, and a special arrangement is provided whereby not only is the heat of the fusion zone diffused over a wide area and transmitted upward to the reduction zone, but there may also be formed in addition to the carbon reducing agent, a very active reducing agent in the form of carbon monoxid, which shall traverse the charge to be reduced. Where fusion takes place by means of heat produced between electrodes separated by a resistance, there is always at the fusion zone an excess of heat, which ordinarily is wasted, because it passes downward with the molten metal. To make this heat rise in the furnace and to increase the area of the fusion zone, an arrangement has been devised whereby gas is taken from the mouth of the furnace above the charge to be reduced and blown into the fusion zone or crucible adjacent to the electrodes, the furnace being at the same time sealed to prevent the entrance of external air and kept under required pressure.

Flux.

Mr. William H. Wherry, of Cleveland, Ohio, has patented an improvement in fluxes for uniting metals. In this invention it is intended to provide a flux which shall perform the following functions: it shall combine chemically with both the metals to be united, lower the fusing-points and increase the fluidity of both metals, clean the surfaces of both metals, and thereby admit of more perfect contact between them, by dissolving the oxids of both metals and reducing them to the metallic condition, and when volatilized, remove oxygen from the contact-surfaces both by removing the air mechanically and by combining chemically with the oxygen of the air.

A New Type of Sleeping Car.

Between Indianapolis, Indiana, and Columbus, Ohio, a distance of 190 miles, quite a new type of sleeping car is to be run. The berth arrangements in the new vehicle differ from those in a Pullman car in that each section is completely screened off into a separate compartment by flexible partitions, which, during the day, are kept under the floor of the car. It is intended to run these cars as parlor cars during the day, and by night to utilize them as sleeping cars. They are being built, and are to be operated by the Holland Palace Car Company of Indianapolis.

Improved Drilling Machine.

Mr. Henri Balluet, of Nouzon, France, has assigned to Mr. Julien E. Thome, of the same place, a patent recently obtained by him in this country on an improved drilling machine.

The invention is characterized by the arrangement of a device enabling the rest or support of the operating-crank to turn one hundred and eighty degrees around the drill-holder, and to keep this rest at the required inclination in order to facilitate certain works, and to allow the tramways to pass when the machine is used for drilling tramway-rails.

A drill-holder is provided upon which is supported a gear-wheel and a sleeve or socket. A second gear meshes with the drill-holder and a crank is connected with said second gear. Upon one end of the drill-holder is supported a crank-rest, between which and the sleeve the first mentioned gear is arranged, said sleeve being provided with a collar which engages the crank-rest. Means are employed for holding the crank-rest and collar together.

New Incandescent Mantle.

Two sets of cotton, ramie, or silk threads are used in the manufacture of a new earth incandescent structure for electric lamps and gas or vapor burners. One set is impregnated with a solution of nitrates of refractory oxides, while the other set is treated with such salts of the platinum group as are capable of leaving behind a body of homogeneous metal when exposed to a moderate heat, such, for instance, as the compounds formed by the metals or their halogens with aliphatic sulphur derivatives, particularly the nitrates of the sulphite salts. The impregnated threads are well dried, and compound threads are formed in which threads of the first kind are coiled round so as to cover threads of the second kind. These are then formed into the required shape, and exposed to a calcining heat to burn the fibre, to reduce the platinum salts to the metallic state, and to convert the earth salts into oxides. The structure obtained is finally treated with a solvent for removing the oxide crust.

Case Hardening Compound.

Joseph Cadotte, of Suncook, N. H., has invented a case hardening compound for employment in the operation of case-hardening metals and implements, especially steel and steel articles. The compound, which is in the form of a dry powder, consists of the following ingredients in or about the proportions stated, which proportions are, in quantity: white calcined plaster or plaster-of-paris, forty per cent; prussiate of potash, forty per cent; lampblack, twenty per cent.

The ingredients before being mixed are each ground to a fine condition, and the finely-divided ingredients are then thoroughly mixed together, and the compound is ready for use.

In the use of the compound the metal or implement is first heated to a required degree of temperature, and is then coated with the compound by immersion or otherwise, the compound

adhering to the surface. The heat from the coated metal or implement causes what may be termed a "boiling" action of the compound, which is allowed to continue for a few seconds, during which time the compound acts upon the metal to case-harden it. The calcined plaster and prussiate of potash combine to produce an annealing effect on the metal, and to retard its cooling to permit the lampblack (carbon) to penetrate the surface sufficiently to give hardness and toughness without the objectionable quality of brittleness.

One advantage possessed by tools treated with this improved compound is the tendency to retain their temper while being subjected to high temperatures in use—as, for instance, in the treatment by tools of metal while in a heated condition.

Machine for Rolling Tires.

A novel machine for rolling tires has been patented by Peter Eyermann, of Philadelphia, Pa., and the patent obtained thereon has been assigned to Charles T. Schoen, of New York, N. Y.

The object of the invention is to provide a machine for rolling wheel-tires in which the tire is held up against the shaping rolls by an idler roll mounted in a pressure-exerting carriage. The invention comprises a suitable number of shaping-rolls capable of adjustment to admit of operating upon the tire as it is reduced, and a pressure-roll mounted in a carrier which is provided with positively acting adjusting mechanism to hold the pressure-roll up against the inside of the tire as it is being formed by the action of the shaping-rolls.

Progress in the Generation and Use of Electric Energy.

The production of electricity direct from coal without intermediary processes has been the dream of inventors for many years past; but energy and ingenuity in this field seem to have been largely misspent. Certainly no progress worth mentioning has been made in the past ten or twelve years even though periodically rose-colored accounts have appeared of some new way of attaining the desired end. What progress there has been in the generation and use of electric energy has come along conventional lines—through improvement in the steam engine, the development of the steam turbine and the gas engine, and the perfecting of electric lamps and introduction of new and more economical lighting systems, such as that, for example, represented by the Cooper Hewitt mercury vapor lamp. The gas engine today comes nearer the commercially successful direct producer of electricity from fuel than anything else, and no one has been quicker to realize this and to try to provide for the requirements which will ultimately spring from this fact than the builder of large steam engines. Hence we find the large gas engine in a number of cases as an auxiliary output of the steam engine shop, with fair promise of becoming the chief end of the business in the near future; and where the gas engine has not thus been taken up, the steam turbine has

taken its place, with the result that this once despised rotary motor is now on the market in a number of different designs, and has orders to its credit of hundreds of thousands of horse power.—*Cassier's Magazine*.

New Preserving Process.

A process for preserving meats, sausages, fruits, etc., has been lately patented in Germany. The article to be preserved is covered with a mixture of dextrine and gelatine or glue; it is then dipped into a solution containing five per cent of formalin and afterwards slowly dried at a temperature of from thirty to forty degrees celsius. This treatment with the formalin solution has a hardening effect on the dextrine coating. To preserve the juice in very juicy or rich provisions, like fresh meat or peeled fruits, it is recommended to first cover them with a thin coating of paraffin, then to dip them into an alcoholic solution of rosin, and then go through the treatment described above. Under certain conditions, where it is thought best, it would be well to thoroughly sterilize the provisions or fruits in boiling water before having them covered up. It is asserted that articles so treated are most successfully protected against all insects, unsanitary influences in the air etc., also that they are not rendered impure by the necessary handling.

The Otto Gas Light.

There is much discussion in industrial circles in Paris on the facility of installation, simplicity of production, great lighting power, and, last not least, cheapness, of the new illuminant, the "Gas Atmospherique Otto." This gas is not obtained from coal, nor is heat used in its manufacture, but the process used is ordinary carburetion of air. There is no sediment whatever left in the pipes, and, it is asserted, there is not the least danger from asphyxiation in case of a gas escape. Another great advantage of the Otto light consists in the facility of fixing the apparatus.

A New Explosive.

The latest in explosives is powdered aluminum, mixed with nitrate of ammonia and put upon the market under the name of "Ammonal."

This explosive is said to be one of the surest and safest known, as it can not be exploded by friction or blow, and otherwise complies with all requirements for an explosive. The fact that aluminum is not affected by nitric acid gives the important property to ammonal of not being subject to disintegration. As it is not affected by frost, accidents which so often occur when thawing out frozen dynamite, are not to be feared.

The explosion is caused by an ordinary cap.

It is self-evident that moisture should not affect an explosive, and this property is claimed for ammonal. This appears, however singular, as nitrate of ammonia, which is contained in the explosive, absorbs moisture easily.

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Bridge. Ferry..... J. Anderson
Bristle combing machine..... B. M. Schaubman
Brush..... 2 pats..... W. H. Bennett
Brush holder..... H. Geisenhoner
Brush making. Machine for preparing bristles
for..... B. M. Schaubman
Bucket..... G. H. Williams
Bucket. Clam shell..... G. H. Williams
Bucket. Grab..... J. W. Seaver
Buckle..... J. A. Gavitt
Buffer..... W. M. Fulton
Buffer wheel..... J. Hornby
Building block mold..... E. W. Dietz et al
Building construction..... L. N. Blydenburgh
Cabinet. Kitchen..... C. F. Boule
Cabinet. Toilet..... M. Wohl
Can body forming and seaming machine.....
..... H. C. Black
Can opening or closing implement J. B. Aikin
Can or jar..... W. A. Lorenz
Can or jar..... C. W. Millett
Candelabrum..... W. Schimpf
Cane stripper and header..... H. H. Mohler
Cane. Treating sugar..... M. Weinrich
Car appliance. Railway..... A. J. Brislin
Car door reinforcing and locking means.....
..... W. W. Tobey
Car. Dump..... R. S. Cox
Car. Dump..... F. S. Ingoldsby et al
Car. Dump..... G. L. Pratt
Car. Electric..... M. Rounds
Car replacer..... E. Showalter
Card stamping machine. Jacquard.....
..... W. W. Hodgson
Cargoes. Means for discharging.....
..... H. A. Middaugh
Carriage body corner..... J. Ahr
Cartridge loading device..... C. B. Helm
Cash register and indicator A. De Vilbiss et al
Cash register and indicator..... J. E. Kelly
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..... H. Passow
Cement. Manufacture of..... C. von Forell
Centrifugal machine..... M. Guttner et al
Chain guard..... P. Mullen
Chalking line. Self..... F. J. Stanley
Chuck. Rock drilling machine. F. Henderson
Cigar band..... T. Englehardt
Cigar bunching and wrapping machine.....
..... J. A. Bach
Clock chimes..... A. Fuhrer
Clock striking mechanism..... F. G. Berling
Clock. Watchman's..... A. Huberty
Clod crusher..... F. E. Caton
Closure..... E. E. Chapman
Clothes line. Traveling..... S. A. Brown
Clover buncher..... A. R. Nicholas
Clutch. Magnetic..... E. M. Hewlett
Coaster brake..... G. F. Barton
Coffee pot..... J. Heinrichs
Coil. Spark..... C. P. L. Noxon
Coils. Forming..... L. F. Fales
Collar or the like. Horse..... J. E. Chilotey
Column. Metal..... J. Lanz
Combustion regulating attachment.....
..... J. M. W. Kitchen
Commutator..... H. F. T. Erben
Concrete block mold..... H. H. Spears
Cone arbor..... G. W. Foster
Connection terminal and plug..... W. W. Dean
Conveyer..... W. H. Garrett
Cooker..... M. M. Archerd
Cooker lid. Steam..... C. F. Kaul
Copying ribbon..... J. O. Deckert
Cord holding and serving device..... A. A. Low
Corkscrew..... H. D. Armstrong
Corn shock binding device..... W. Battice
Cornet mouthpiece..... C. G. Conn

Coupling device..... J. Pellington
Coupling for textile roller sections.....
..... G. H. Milward
Cradle..... L. Moody
Culler frying frame..... H. Grimm
Cultivator..... F. Bateman
Cultivator..... O. R. Baldwin
Cultivator harrow attachment W. E. Mauldin
Current and propulsion wheel..... I. L. Roberts
Curtain. Adjustable window..... F. A. Frenzel
Curtain protector..... C. Hoffmann
Cuspidor..... S. Fisher
Cylinder perforating machine J. L. Boyle et al
Cylindrical bodies. Producing J. L. Boyle et al
Decoy duck..... A. Kremer
Dental dam holder..... E. S. Rinehart
Digging machine..... S. B. Fleming
Display bracket for show cases, windows, &c.
Interchangeable and adjustable.....
..... C. E. Latshaw
Display stand. Portable..... J. A. Marsh
Door check and closer..... F. H. Ogden
Dough to the form required for loaves. Ma-
chine for automatically shaping F. J. De Witt
Draft rigging..... H. C. Priebe
Drawer..... W. H. Coye
Dredge bucket..... F. Z. Hunt et al
Drilling bit..... R. C. Baker
Drowning. Prevention from J. A. Stenken et al
Drying apparatus..... J. J. Smith
Drying machine..... E. G. Smith
Dyestuff and making same. Blue sulfur.....
..... N. Rongger
Educational appliance..... L. M. Hollingsworth
Egg case..... E. F. Ward
Egg opener..... W. R. Hartigan
Egg preserving compound..... W. F. Brown
Elastic wheel..... K. O. Ahlquist
Electric apparatus is attached. Winding de-
vice for cables to which movable.....
..... G. Ackermann et al
Electric circuit connector..... W. H. Kelsey
Electric circuit breakers. Retarding device for
..... A. R. Cheyney
Electric conductor..... F. Lowendahl
Electric lighting system..... J. F. McElroy
Electric machine. Dynamo..... H. Geisenhoner
Electric switch..... C. C. Badeau
Electrical conductor support..... R. Orr et al
Electrical machine brush holder J. F. McElroy
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Electrical regulation system..... J. L. Creveling
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Elevator safety cushion..... W. D. Baker
Elevators. Rotatable grain distributor for.....
..... J. C. Spangler
Emery wheels. Disintegrating..... J. Rice
Engine tender. Traction..... T. H. Pitzer
Evaporating apparatus. Brine..... O. Sachse
Excavating apparatus. Rock..... C. T. Drake
Excavating bucket..... 4 pats..... H. L. Reynolds
Excavating machine..... 2 pats..... C. T. Drake
Explosive engine..... B. Wright
Farm gate..... C. Wilson
Feed trough. Animal..... E. B. French
Feeding trough..... J. F. Butz
Feed water heater..... W. Thurmond
Feed water regulator..... C. C. Tozier
Feed water to steam boilers. Apparatus for
controlling the supply of..... H. A. Fleuss
Feeder..... L. F. Fales
Fence..... W. Jenkins
Fence post..... D. Bice
Fences. Device for preventing animals from
breaching wire..... D. C. Benjamin
Fifth wheel..... W. B. Fletcher
File. Letter or bill..... W. O. Gottwals
Filling machine. Automatic..... W. Koedding
Fire escape..... S. M. Hunt
Fire kindler..... G. H. Lotspike
Firearm. Automatic..... J. M. Browning
Firearm extractor..... T. G. Bennett
Firearm magazine..... C. H. A. F. L. Rosz
Fireproof stairway..... F. A. Wenslow
Flash light apparatus..... E. C. Dodge
Flat iron..... A. B. Atkins
Flue cutter. Pneumatic..... J. T. McGrath
Fluid compressor..... F. M. Rites
Flushing apparatus. Closet..... P. F. King
Flushing tank..... F. H. Lindenberg
Folding machine..... J. J. Taylor et al
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Foundation..... E. C. Hodges
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Furnace construction..... J. M. Scanlan
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Gasoline generating apparatus..... B. C. Smith
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Gear for presses or other machinery. Driving
..... O. Spahr
Gliding machine..... C. Raschig
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Glass plates or sheets. Manufacture of.....
..... W. L. Kann
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Governor. Reversible shaft..... C. R. Minor
Grain hulling and scouring machine.....
..... W. E. Larnon
Grease cup. Automatic compression.....
..... D. B. Williams
Grinding mill..... P. R. Janney

Grinding or other machine. Cutlery J. Oefinger
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Gun sight..... H. B. Andrus
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Hame and trace connecton..... F. E. Goodman
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Harvester. Cotton..... J. M. Philbrick
Harvester. Pea..... B. W. Thach
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Machine for..... R. Richter
Hat brim stretching machine..... J. H. Tarbell
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..... A. Brodin
Hats, coats, &c. Hanger for..... A. L. Fields
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Hide or skin treating machine R. W. Strout
Hinge. Spring..... E. Bom
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Hoist..... E. Y. Moore
Hoisting apparatus..... O. F. Lidke
Hoisting machine..... S. M. Foltz
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Hydrocarbon burner..... L. Stockstrom
Ice cream freezer..... D. Rugg
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Ironing table..... F. X. Krabach
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Isodiametric bodies. Machine for making.....
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Knap sack..... W. H. Bradbury
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Liquids. Heating, straining or filtering, and
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Lumber dry kiln..... W. P. Hussey
Magnet coil for electrical machines. Field.....
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Mail bag catcher and deliverer..... J. N. Thomas
Mail box..... D. J. Wilson
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Map hanging device..... F. Zimmerman
Marker. Disk..... C. H. Myers
Match box filling machine..... A. Schuster
Match box holder..... E. A. Parker
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Match making machine..... W. H. Parker
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Milk extract similar to meat extract. Making
..... X. Binder
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..... G. H. Davis
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Needle case..... J. H. Boye
Nest. Hen's..... H. A. Bierley
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Nut lock..... C. Miller
Nut lock..... A. G. L. Wenner
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Optical illusions. Device for producing..... H. A. Gage
Oven, Baker's.....C. F. Igelmann
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Packing.....G. R. Beamer
Paper feeding machine.....4 pats. T. C. Dexter et al
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Paper, &c. Machine for feeding and preparing blanks of.....C. W. Gay
Paper. Making cloth lined.....E. Y. Le Fevre
Paper making roll.....H. Parker
Paper slitting device.....J. F. Fromm
Partitions. Means for operating rolling.....W. Lumley
Penholder guide.....S. Bacharach
Pencil holder. Pocket.....E. C. Baes
Pencil sharpening device.....H. E. Curtis
Permutation lock.....M. B. Mills
Phonograph attachment.....G. E. Allen
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Piano action.....L. N. Soper
Piano self playing attachment.....J. Wieser
Pier guard. Bridge.....H. T. Swearingen
Pile fabric. Woven.....J. Buckler
Pineue hydrochlorid. Purifying.....W. Naschold
Pipe coupling. Air.....H. C. Lafferty
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Plaiting machine.....M. F. Havens
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Pneumatic despatch tube systems. Selective device for.....E. A. Fordyce
Pole protector. Carriage.....M. A. Mack
Pole tip. Vehicle.....M. A. Foley
Pool ball rack and register.....E. R. Marshall
Poultry hanger.....A. Hildebrandt
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Press.....F. E. Warner
Pressure gage testing device.....C. B. Bosworth
Printer's furniture.....S. Stephens
Printing device for cash registers.....J. P. Cleal
Printing device for paper rolls.....J. W. Bolger
Printing machine.....C. W. Gay
Printing machine. Hosiery.....R. Baird
Printing plate supplemental press base.....C. E. Beach
Printing plates. Producing celluloid.....B. Ludwig
Printing surfaces. Manufacture of metallic.....W. E. W. Southwood
Propeller.....R. W. Shaw
Propeller. Boat.....H. W. Sturges
Propeller gear. Reversing.....G. S. Slocum
Propeller. Oscillating.....W. B. Terry
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Punches, &c. Appliance for operating.....T. A. Weston
Rack.....F. X. Krabach
Rail joint.....J. H. Young
Rail joint chair.....L. L. Savoie
Railway brake.....F. Prochaska
Railway motor.....E. D. Priest
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Railway or tramway points. Automatic apparatus for controlling and operating electric.....T. B. Stewart et al
Railway signaling apparatus. Pneumatic.....E. C. Irving
Railway switch. Automatic.....H. W. & C. R. Summers
Railway switching mechanism. Street.....W. J. Bell
Railway tie.....I. M. Warner
Railway tie.....H. F. Thompson
Railway track.....H. F. Miller
Railways. Apparatus for removing ice from track or conductor rails of.....P. B. Delany
Ratchet wrench.....G. Hansen
Ratchet wrench.....W. Murch
Razor sterilizing device.....F. E. King
Reamer.....F. G. Echols
Registering mechanism.....W. H. Pratt
Reversing mechanism. Automatic.....J. C. Schaeffler
Rheostat. Starting.....H. B. Wilson
Rosette.....E. J. Hunt
Rotary engine.....J. D. Halewy
Rotary engine.....I. V. Ketcham
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Ruler.....J. F. Cooke et al
Said blast apparatus.....N. Farnham
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Saw. Steam power crosscut.....J. A. Reed
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Screw cutting machinery.....J. Alger et al
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Secateur.....A. W. A. Barnard et al
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Shafts and arms. Connecting device for.....S. Frazier
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Shelf. Window.....I. D. Bennett
Ship building.....P. Eyermann
Ship building plant.....J. W. Seaver
Ship's distance and course recorder.....W. C. Forbes
Shoulder pad.....H. Lavine
Shredder head.....C. E. Curtiss
Shuttle threader.....T. Paquette
Sifter. Ash.....G. N. Houghton
Sifting flour, meal, &c. Device for.....W. S. Hayden
Signalling apparatus.....J. E. Allison
Signaling device. Automatic.....J. Floss
Sleigh. Automobile.....E. S. Weaver
Sluice box. Movable.....F. Francois
Snap hook.....H. R. Mellicoe
Spark arrester and extinguisher.....A. P. Zink
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Sprocket band.....A. S. Reed
Stacker. Pneumatic straw.....S. D. Felsing

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Steel. Manufacture of.....B. Talbot
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Storage pocket.....L. J. Anderson et al
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Stove.....H. D. Perky
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Stove. Portable.....J. Watson
Stovepipe. Adjustable.....R. I. Connelly et al
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Straightening and tempering device.....M. J. Ryan
Support. Foldable.....P. R. Goode
Surgical apparatus.....B. R. Willis
Suspenders.....M. Murry
Switch.....I. B. Ritter
Switch operating mechanism.....2 pats. O. D. Hunt
Switchboard. Multiple.....C. M. Hedman
Swivel coupling.....R. C. Scruggs
Syringe and applicator. Combined.....E. N. La Veine
Tag.....S. Dancyger
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Target.....H. B. Hollifield
Telephone lines. Connection counter for reissue.....F. R. McBerty
Telephone or like cable.....F. Tremain
Telephone wall set.....E. B. Fahnstock
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Thill coupling.....G. H. Fernald
Threshing machine.....W. W. Dingee
Tie and rail clasp.....F. W. Topfiff
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Traction device.....S. M. Wilson
Traction engine.....B. J. Diplock
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Trolley pole.....J. R. Hollis
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Tube welding apparatus. Electric.....2 pats. G. Baehr
Turbine. Elastic fluid.....C. G. Curtis
Turbine wheel. Elastic fluid.....J. Wilkinson
Type writer.....R. W. Walker
Type writing machine.....C. Gabrielson
Type writing machine.....L. S. Burridge
Type writing machine.....C. F. Hopkins
Type writing machine.....F. W. Hillard
Type writing machine. Electrical.....W. E. Roberts
Type writing machine paper clamp.....F. W. Hillard
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Underdrawers.....A. G. Velasco
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Valve. Automatic.....A. L. Richards
Valve. Back pressure relief C. A. Cunningham
Valve operating device. Steam generator.....J. E. Baldwin
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Valve. Tapping.....L. W. Gates
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Vehicle body.....J. Vollman
Vehicle. Mechanically propelled D. M. Dearing
Vehicle. Motor.....H. Ford
Vehicle running gear.....J. C. Boyd
Vehicle top.....A. Bancroft
Vehicle window mechanism for canopy tops.....J. L. Lawrence
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Vending machine. Coin controlled liquid.....J. Anderson
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Voting machine.....L. W. Luellen
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Washing machine motor.....G. A. Averill
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Water closet valve mechanism.....M. C. Gholson
Water closet ventilating device.....A. Drouillard
Water closets, &c. Flushing reservoir for.....A. M. Morrison
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Winding and printing machine.....W. F. Marresford
Winding machine. Thread.....G. W. Foster
Window cleaner.....G. A. W. McForney
Window lock.....E. Foster
Windows, fan lights, &c. Fastening for casement.....C. Rosenheim
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Yarns or threads from short fibers. Apparatus for manufacturing.....M. Muller

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Ceiling border plate.....D. H. Wagner
Ceiling center plate.....D. H. Wagner
Ceiling corner plate.....D. H. Wagner
Ceiling sheet metal border plate.....D. H. Wagner
Ceilings and molding therefor. Sheet metal field plate for.....D. H. Wagner
Collar.....F. Edelmann
Comb.....2 pats. E. B. Kingman
Comb. Pompadour puff.....J. E. Lowe
Doily or similar article.....J. W. Catty
Glass vessel. Cut.....J. Wilson
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Harmonica.....H. Hohner
Heater casing. Gas.....J. J. Lawler
Ink receptacle.....L. A. Brown
Medallion or similar article.....J. E. Straker, Jr
Picture frame.....H. L. Ashton
Pictures, mirrors, &c. Frame for E. Oldenbusch
Spoons, forks, or similar articles. Handle for.....E. Crees et al
Spoons, forks, or similar articles. Handle for.....J. E. Straker, Jr
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Bottle stopper.....A. Buckman
Bottle support. Nursing.....B. E. Ives
Bottles, cans, &c. Top for tooth powder.....H. B. Kent
Box.....W. B. Brooks, Jr
Box covering machine form block P. S. Smith
Box label and lid holder.....E. J. Mitchell
Boxes. Machine for pressing necks in.....P. S. Smith
Brake.....D. F. Earuest
Brake block and shoe. Separable.....W. D. Sargent
Brake head.....W. D. Sargent
Bread cutter.....W. H. Busser
Bronzing machine.....A. Weber
Broom. Whisk.....H. L. Harris
Brush. Paint.....J. P. Kneehmann
Bucket dumping apparatus.....H. K. McCaughey
Bucket suspension device.....J. H. Hayward
Buckets. Suspension device for two rope.....H. L. Reynolds
Building block molding machine.....J. B. Cotton
Bullet mold.....J. W. Anderson, Jr
Bundle carrier.....P. E. Le Fevre
Button and tie holder. Combined.....E. Stempel
Button. Collar.....F. G. Neuberth
Button. Linen.....H. Kirchhoff
Cableway.....T. S. Miller
Calculating and recording machine C. D. Baird
Calculating instrument.....H. N. Pierce
Calculating machine.....H. Kaussen
Calculating, printing, or analogous machine attachment.....A. R. Boynton
Camera shutter.....I. M. Macy
Cans, &c. Machine for operating on.....C. H. Hanford
Candy making apparatus. Rock.....T. Suzuki
Candy pulling machine.....C. D. Frankson
Car bolster.....S. P. Bush
Car construction.....D. C. Courtney
Car coupling.....G. A. Hermanson
Car coupling.....P. J. Dugan
Car coupling.....F. Lehrmann
Car door. Grain.....R. G. Jenckes
Car drop doors and operating mechanism.....D. C. Courtney
Car. Dump.....J. D. McGrath
Car fender. Self adjusting.....A. O. Lamson
Car. Railway.....2 pats. C. Vanderbilt
Car reflector.....D. F. Cargill
Car. Sand.....A. F. McCounell
Car seat.....F. K. Fassett
Car. Side dumping.....R. H. Hornbrook
Car switch operating apparatus. Tramway or other.....A. King
Car wheel.....G. S. Kyle
Car window lock.....C. Graham
Carpet sweeper.....G. L. Reensterna
Cash register.....2 pats. T. Carney
Cash register.....J. P. Cleal
Cash register.....W. H. Muzzy
Caster. Ball.....H. S. Cross
Casting.....H. H. Frankliu
Cement shingle.....G. C. Zwerck
Cement shingles. Maching for making.....G. C. Zwerck
Centrifugal machine.....M. H. Barker
Charring and dry distillation of organic substances. Apparatus for continual.....H. C. Aminoff
Chimney.....C. Weber

Check perforating and printing machine.....G. F. Robertson
Chemical mixer.....A. G. Stevens
Chlorination barrel.....2 pats. W. J. Armbruster
Chuck. Drill.....W. G. Middleton
Churn dasher fan attachment.....A. F. Moody
Churn operating mechanism.....I. W. Beeler
Cigar branding machine.....I. Liberman
Circuit changing apparatus.....W. Meyer
Cisterns or the like. Means for constructing.....W. Skinner et al
Clamp collar.....D. M. Lester
Clasp for garters, &c.....C. E. Schaffner
Cleaning machine.....D. A. Kennedy
Clevises, &c. Pin locking mechanism for.....H. A. Bergom
Clipper. Hair.....J. K. Priest
Clock.....M. Wortmann
Clock striking mechanism.....A. C. Schuman
Closet seat collapsible protecting device.....I. Franken
Closets, &c. Siphon reservoir for toilet.....A. M. Morrison
Cloth holder.....L. S. Winterbotham
Coal loading apparatus.....C. Allison
Cock. Safety gas.....H. J. Doll
Coffee pot.....T. B. Ferguson
Coffin guide.....W. Koepfer
Coke lorry.....G. D. Macdougall
Collar fastener. Horse.....J. R. Rose
Comb.....M. H. Richardson et al
Compound engine.....A. J. Peet
Condiment holder.....J. B. Williamson
Conveyer and elevator. Endless.....T. A. Coffin et al
Conveyer controlling system.....A. C. Eastwood
Cooking attachment. Muffler.....J. H. Fox
Cooking utensils. Inner containing vessel for.....A. Siebelist
Copy holder.....F. C. Shobert et al
Copy pad.....T. B. Ferguson
Couch.....J. R. Hardtmann
Counting and indicating machine.....W. Ackerman
Cream separator and churn. Combined.....J. A. Rosback
Crutch.....J. H. Hammond et al
Cultivator tooth mounting.....F. Bateman
Cupboard extension.....J. H. Waite
Curtain bracket. Combination lace and roller.....J. Yonker
Curtain fixture.....A. L. Foy
Curtain or awning.....J. A. Charlton
Curtain pole bracket.....A. Zimmerly et al
Cutlery polishing machine.....W. C. & J. B. Mallinson
Dead. Preserving the.....J. Karwowski
Detector bar clip and link.....T. G. Stiles
Dish washing machine.....H. H. Jones
Disinfecting apparatus.....F. C. Nye
Display front for boxes.....F. Davis
Display holder for ladies' hats.....F. P. Rabin
Dissolving organic or inorganic substances. Apparatus for.....C. H. Rider
Distilling apparatus.....J. Stoker
Door and hanger therefor. Pocket ball-bearing.....J. K. Thoma
Door opening device.....O. M. Edwards
Door stop.....A. A. Terry
Dress clip.....T. Morton
Driers. Filing or emptying apparatus for vacuum.....E. Passburg
Driving apparatus.....A. E. Norris
Dye and making same. Blue antraquinone.....E. Hepp et al
Dye. Trisazo.....A. Israel et al
Eggs. Composition of ingredients for improving storage.....B. Prikryl
Electric circuit regulating device.....2 pats. M. H. Baker
Electric circuits. Constant power factor regulator for.....M. H. Baker
Electric circuits. Regulating.....2 pats. M. H. Baker
Electric generator for intermittent currents.....M. P. Ryder
Electric generator. Turbine E. H. Porter et al
Electric meter.....L. Gutmann
Electric switch.....I. G. Waterman
Electricity for sectional circuits. Bar for collecting.....H. Dolter
Elevator.....A. & T. E. Winarski
Elevator.....A. R. Willey
Elevator signaling apparatus.....2 pats. J. McLean
Engine cooling apparatus. Internal combustion.....G. McCadden
Engine lubricator filler. Steam.....A. M. Crowl
Engine piston. Steam.....J. Swan
Engines. Feeding and igniting device for explosive.....W. Remington
Evaporative cooler or condenser.....W. H. Miller
Expansion joint.....R. E. Vail
Explosion chambers. Apparatus for loading.....F. Anschutz
Explosion chambers. Device for cleaning.....F. Anschutz
Explosive engine.....H. G. Underwood
Eyeglasses.....J. W. Corley
Fabrics. Machine for shaping and trimming pieces of.....H. Bryce
Fan attachment.....G. Donnelly
Fan. Toilet.....A. H. Miller
Fastener.....T. Giguere
Fastening device.....W. Kailsling
Fat like substance and making same.....O. Liebreich
Faucet.....G. A. Soderlund
Feed cutters. Pneumatic conveyer attachment for.....L. J. Lee
Fertilizer distributor.....J. & J. D. Boyd
Fertilizer drill.....W. N. White
File cabinet partition. Adjustable I. H. Athey
Filter.....J. B. Allen
Filtering system.....G. Moore
Filtering system. Water.....D. M. Pfautz
Fire escape.....W. R. Smith
Fire escape.....C. H. Parvin et al
Fire escape.....C. M. Petersen
Fire kindler.....E. C. Sachse
Firearm single trigger mechanism G. C. Clive
Firearm. Tubular magazine.....W. Mason et al
Fireplace.....A. W. Hall
Flash gas burners or lamps. Feed device for.....R. Wright et al
Floor construction.....C. A. Balph
Floor joint. Water closet.....H. S. Reuton
Fluid pressure. System for controlling.....E. D. Priest
Flushing apparatus.....J. H. Byers
Fly wheel.....F. James

Fuel saving briquet..... H. Eggers
Food product and making same. Dry ..
..... H. Wintruff
Freezing device. Milk or other liquid.....
..... J. W. MacDonald
Furnace..... W. V. Beasley
Galvanizing apparatus. Metal sheet.....
..... E. A. Davies
Game apparatus..... H. K. Leonard
Game apparatus..... M. A. Bean
Game. Indoor..... S. B. Monson
Garbage receptacle..... J. Thiele
Garden implement..... R. Thohig
Garment clasp..... C. B. Hoy
Garment supporter..... C. E. Hawkes
Garment supporter..... J. Jenkins
Gas burner. Adjustable..... W. E. Guese
Gas burner. Incandescent..... T. Gordon
Gas burner. Incandescent..... C. A. Blum
Gas burner. Safety..... A. Dominick
Gas check..... U. G. Densten
Gas light. Incandescent 2 pats..... V. H. Slinack
Gas lighting apparatus..... H. Rostin et al
Gas or air tubing. Attaching socket for ..
..... A. W. Nicholls
Gas producer..... J. W. Gayner
Gas producer system..... W. E. Hartman
Gas retort..... J. Steinb ecker
Gate..... B. G. Olson
Gate operating device..... R. P. Pierce
Gear. Variable speed transmission..... G. Apple
Gearing. Variable friction..... L. Sanders
Glass tank furnace..... H. L. Dixon
Glove or mitten..... S. Hollenbeck
Glove turning machine..... W. S. Ayres
Glowing machine. Neck..... P. S. Smith
Governor..... E. W. Evans
Governor adjusting mechanism.....
..... L. Skinner et al
Governor. Vapor engine..... A. Buchner et al
Grain drier..... J. G. King
Griddle greaser..... C. H. Haight
Grinding machine..... A. A. Baker
Grinding machine..... B. F. Bartrug
Gun carriage or limber or ammunition car ..
..... A. T. Dawson et al
Gun recoil check..... J. F. Meigs et al
Guns. Electric firing gear for breech-loading ..
..... J. F. Meigs et al
Hair crimper..... J. F. Martin
Hair pin..... S. H. G. dberg
Hair waver..... M. S. McIntire
Hammer. Foot power..... W. Baker et al
Harness. Breast..... S. O. Barden
Hay loader..... R. E. Alger
Hay loader and stacker..... F. L. Doty
Hay rack and wagon box. Combined.....
..... I. Williams
Heating pad. Electric..... W. Rickards
Heel attaching device..... C. W. Woods
Hinge..... H. Hotz
Hinge. Leaf..... W. M. Gamble
Hoisting and dumping apparatus. Combined ..
..... W. F. Weber
Hook provided with counting mechanism ..
..... C. A. G. Bremer
Hopper feed regulator..... A. T. Ferrell
Horse power..... J. C. Vavra
Hose coupling..... W. K. Kuler
Hose nozzle supporting and guiding device ..
..... W. R. Joyner
Hub. Vehicle wheel..... E. H. Whiting
Hydraulic press..... J. H. Ferguson
Hydrocarbon burner..... L. A. Eggert
Ice tool..... H. J. Kingsley
Igniting device..... W. Gardner
Incubator heater and ventilator.....
..... O. P. Shoemaker
Index. Card..... C. McPike
Induction coil vibrator..... R. Varley
Ink filler..... J. B. Barnes
Ink well..... S. D. O'Donnell
Insect destroyer..... J. H. Sewell
Instep support or arch prop..... J. W. Arrowsmith
Instep supporting and insulating pad.....
..... E. Mayer et al
Interlocking mechanism..... F. Bement
Internal combustion engine..... W. M. Britton
Ironing board..... H. C. Dillon
Ironing machine gearing..... C. W. Standcliffe
Ironwork and preparing same. Material for ..
..... W. O. Emery
Jacquard machines. Apparatus for setting ..
..... J. Szczepanik
Journal bearing..... J. Buker
Kitchen utensil..... W. E. Berry
Knapsack, hammock, and sleeping bag. Con-
vertible..... G. Klein
Knife..... T. Wenger
Knitting machine..... G. A. Leighton
Knitting machine..... C. A. Santmyers
Knob. Door..... W. Munro
Lamp cut out. Arc..... M. H. Baker
Lamp. Electric arc..... K. Tornberg
Lamp for multiple or parallel circuits. Elec-
tric arc..... R. H. Henderson
Lamp Gas..... T. Gordon
Lamp holder. Mine's..... J. A. Brown
Lamp socket. Incandescent..... C. Wagner
Lamp socket. Incandescent electric.....
..... C. Bakeley
Latch Gate..... J. R. Abernathy
Lath. Double turret..... J. C. Potter et al
Lifting jack..... F. M. Williams
Lifting jack and propelling means therefor ..
..... C. E. Roth
Liquid separator. Centrifugal..... J. H. Ayers
Liquor heating apparatus..... J. P. Roche
Lithographic transferring..... G. E. Pancoast
Lithographic transferring device.....
..... G. E. Pancoast
Load on wagons. Means for ascertaining the ..
..... L. M. F. Hacker
Lock..... J. Mills
Lock..... W. K. Kaye
Log overhead turner..... P. Wineman
Loom filling box stand..... J. Trahan
Loom. Kindergarten..... M. P. & D. Todd
Loom let off mechanism..... F. Benz, Jr
Loom. Pile fabric..... P. & E. Leroux
Loom shuttle..... J. Marugg et al
Loom shuttle motion..... J. Frank et al
Loom take up..... A. F. Caswell
Loom weft replenishing mechanism.....
..... H. R. Ross et al
Looms. Web supporting or guiding means for ..
..... J. Frank et al
Lubricant and making same..... S. A. Smith
Lubricating device..... J. A. Gibbons
Lubricator..... A. E. Clifton

Lubricating metallic ball and making same.
Self..... A. Johnston
Magnetic power mechanism..... F. Hachmann
Mail bag..... D. G. McClay
Mail box..... J. J. Sullivan
Manhole closure..... T. F. Morrin
Manure form apatite. Manufacturing.....
..... W. Palmaer
Marking device..... J. E. Langill
Marking machine..... G. L. Richardson et al
Measure. Tape..... G. Dunlea
Measuring device. Opening..... H. C. Parker
Mechanical movement..... S. D. Stevens
Metal cutting and stamping apparatus.....
..... J. W. Paton
Metals. Apparatus for detecting the tempera-
ture of..... A. Sauveur et al
Mine shaft safety device..... N. W. Dickerson
Mining machine. Coal..... R. Robinson et al
Miter box..... R. Dunne
Molasses burner..... J. Anderson
Molding and compressing various articles.
Press for..... O. Bergstrom et al
Mower or reaper pitman..... F. Tuvel
Mowing machine..... J. H. J. Counts
Mowing machine..... B. Holthaus
Mowing machine cutting apparatus..... L. Study
Mowing machine weed attachment..... P. Haason
Mucilage or glue containing devices. Top for ..
..... A. H. Bernard
Music playing mechanisms. Expression indi-
cator for automatic..... G. H. Davis
Musical instrument automatic playing attach-
ment..... P. Wein
Musical instrument mechanical playing at-
tachment..... E. D. Ackerman
Nailing machine..... V. Sandahl
Noise muffler..... S. Bouton
Nut and bolt lock means..... W. Lay
Nut lock..... S. C. Ramsey
Nut. Lock..... W. C. Swift
Nut locking means..... W. Lay
Oil burner..... E. A. Edwards
Oil burner..... E. Boekenkamp
Oil burner..... J. H. Davis
Oil burner..... J. McFarlane et al
Ore treating mechanism..... G. M. Rice
Organ pedal..... E. M. Hughes
Pad holder..... J. Powers
Pad support..... J. Powers
Palette..... W. A. Sussmuth
Paper and making same..... E. H. Fowler et al
Paper box..... H. Runtz
Paper box. Foldable..... M. Hirsch
Paper feeding machine separating and feeding ..
..... E. J. Hallberg
Paper holding clip..... F. M. Crawford
Parcel fastener..... B. Cohn
Pasting machine..... A. Simonson
Pen. Fountain..... W. F. Cushman
Pencil sharpener..... J. C. Hill
Photographic images. Making..... P. G. Frauenfelder
Photographic mounts. Manufacturing.....
..... P. J. Stuparich
Photographic printing frame..... G. E. Mackey et al
Piano. Wireless..... I. F. Gilmore
Pie making machine..... H. L. Manning
Pie plate rim. Supplemental..... W. A. Banfill
Pin for badges, &c..... F. H. Noble
Pipe bending form..... W. Vanderman
Pipe cutter..... B. Colom y Marca
Pitchfork..... L. L. Layne
Plaiting attachment. Skirt..... M. M. Merrill
Plane. Matching..... A. Mason
Planter. Corn..... J. Leyhtwine
Plow..... A. E. Squyers
Plumb bob..... H. J. Wolf
Pocket knife..... M. J. O'Connor
Pocket. Safety..... G. L. Estes
Potato digger..... J. E. Baird
Powder composition. Smokeless..... H. Maxim
Powdered material dispenser..... W. Q. Gausen
Press for oleaginous substances.....
..... G. W. Zoder et al
Press valve operating mechanism..... J. M. Stuart
Printing form..... G. E. Paucoast
Printing machine..... H. A. W. Wood
Printing machine. Ticket..... E. B. Clark
Printing mechanism..... H. A. W. Wood
Printing press offset preventing mechanism ..
..... H. A. W. Wood
Printing, stamping, &c. Platen for.....
..... E. T. Cleathero
Propeller. Screw..... T. H. Eastwood
Propelling device. Boat..... J. S. Worcester
Pulp articles. Machine for manufacturing.....
..... J. H. Rivers
Pulp. Treating..... J. H. Rivers
Pulverizer..... A. Schoellhorn et al
Pump. Air..... M. E. Hamstead
Pumps, &c. Automatic controller for electric ..
..... C. H. Durning
Puzzle..... H. F. Willey et al
Rail joint..... B. P. Taylor
Rail joint..... J. F. Summitt
Rail joint..... J. F. Vilsack
Railway antispreading means..... P. Gavin
Railway ballast tamping machine.....
..... L. R. Moseley
Railway brace and chair..... W. F. Bossert
Railway chair and brace..... W. F. Bossert
Railway chair and stand..... W. P. Hussey
Railway crossing..... J. W. Bennett
Railway crossing signal..... E. E. Wolf et al
Railway frog..... E. B. Entwistle
Railway frog plate clamp..... E. W. Stout
Railway level and gage..... J. C. Johnson
Railway switch. Electrically controlled ..
..... F. T. Kitt
Railway switch heater..... F. S. Whipple
Railway tariff rack..... C. W. Cook
Railway tie..... J. F. Olin et al
Railway tie..... G. F. Jencks
Railway tie. Metal and concrete.....
..... C. H. Quimby
Railway tracks. Machine for raising, regrad-
ing, and ballasting..... E. Holbrook
Ram. Hydraulic..... S. S. Smith
Ratchet and drill brace. Combined.....
..... F. J. Cleaver
Receiver..... F. E. Peters
Refrigerating apparatus generator.....
..... N. W. Condict
Register..... C. Wamsley
Road making machine..... R. T. Head
Roadway..... W. Wilson
Roadways. Laying asphalt or bituminous ..
..... W. Wilson

Rod coupling..... H. A. Dulinsky
Rolling machine. Tube end..... H. Rinne
Rotary engine..... L. J. J. B. Le Rond
Rotary engine..... J. W. Weger
Rotary engine..... F. K. Sturdivant
Rotary engine..... J. Gary
Rotary engine..... W. Olewinski
Rotary engine..... W. J. Rowe et al
Rotary fluid engine..... J. F. Cooley
Rule and calculator. Slide..... W. Crosley
Saccharine. Defecating..... W. C. Salisbury
Saddle. Harness..... T. I. Moorish
Safety pin..... B. P. Herudon
Safety pin..... C. Andresen
Sash lock..... A. Johanson
Sausage stuffer..... R. L. Eby et al
Saw. Horizontal band..... C. C. Stuart
Sawmill machinery..... D. A. Kennedy
Scale..... F. Verplast
Scale. Computing..... F. P. Dunn
Scenic or other displays. Stage or platform ..
..... O. Stoll
Screw and driver therefor..... E. L. Walter
Screw threading tool..... C. R. Gabriel
Seal press..... F. W. Brooks
Seam. Sheet metal..... R. Hawkins
Separating screen..... W. C. Rowe
Service box cover..... H. P. Martin
Sewing machine feeding mechanism.....
..... W. A. Smith
Sewing machine. Shoe..... H. K. Bridger et al
Sewing sweat bands into hats. Machine for.....
..... W. P. Gammons, Jr
Shade and curtain holder..... F. E. Naumann
Shade and curtain holder. Window..... G. Willis
Shade bracket..... M. S. Weaver
Shaft coupling..... D. H. Hendershot
Shampooing. Bib and head rest for.....
..... L. Larrimore
Sharpener. Knife..... J. R. Hare
Shoe tongue..... J. A. Lyons
Show case..... E. C. Thurnau
Sifting machine. Flour..... C. P. P. Grave et al
Signaling apparatus. Electric..... 2 pats.....
..... F. B. Herzog et al
Signaling system..... W. H. Dammoud
Signature gatherer..... N. M. MacDowell et al
Skate..... A. P. Draper
Slack take up mechanism..... E. G. Shortt
Slate. Treating and cleaving.....
..... W. A. McLaughlin
Sled. Bob..... G. Koch
Smelting furnace..... E. Riveroll
Smoke consuming furnace..... C. W. Stanton
Sole. Shoe..... T. Padden
Sound reproducer..... T. H. Macdonald
Spark arrester..... J. Whitehouse
Spectacles..... J. C. Anderson
Spring bearing plate..... C. A. Lindstrom
Spring motor..... J. E. Jordan
Spring switch..... E. B. Entwistle et al
Springwork..... J. A. Staples
Stacker. Pneumatic..... J. Henry
Stamp recording attachment. Time.....
..... C. W. Graham
Stamping and vending machine. Ticket.....
..... E. E. Flora
Stanchion. Cattle..... W. T. Edwards
Station indicator..... F. Clark
Steam boiler..... T. F. Morrin
Steam engine. Multiple cylinder.....
..... H. S. Baldwin
Steam engine. Multiple cylinder.....
..... H. Lemp et al
Steam heater..... W. P. Hussey
Steamer. Domestic..... W. Ashert
Steaming board..... J. Bieberneit
Still. Ammonia..... N. W. Condict
Stoker driving mechanism. Mechanical.....
..... H. Snyder
Stop mechanism..... T. F. Robinson et al
Stove air feeding apparatus.....
..... L. J. & A. F. Brandt
Stove. Convertible..... C. R. Morgan
Stove or furnace. Gas heating.....
..... W. S. Bechtold et al
Stove oven revolving stand..... A. S. Bliss
Stovepipe holder..... C. F. Goodman
Stoves, &c. Air heating device for.....
..... C. E. Whitaker
Street cleaning machine attachment.....
..... O. Brothers
Street cleansing or scavenging apparatus.....
..... F. J. Scott
Stretcher. Collapsible..... E. Kottusch
Sugar. Making..... W. C. Salisbury
Surgical operating frame..... R. C. Hoyer
Swager..... G. B. Stone
Switch operating device..... J. E. Campbell
Syringe. Hypodermic..... A. Schmidt
Table..... T. C. Beach
Tedder..... E. C. Rosenaw
Telegraphy and transmission of power. Wire-
less..... J. T. Armstrong et al
Telephone support..... C. H. Pelton et al
Thermostat..... G. A. Wall
Tire. Elastic vehicle..... E. M. Birdsall
Tire setting machine..... G. Lattin
Tobacco. Harvesting and curing.....
..... J. B. Underwood
Tongs. Ingot..... E. S. Sites
Tongue support..... G. Wenzelmann et al
Top..... J. R. Barry
Top. Musical..... P. V. Michels et al
Tower..... G. P. Youmans
Toy..... G. E. McVey
Toy cradle and savings bank. Combined.....
..... C. Clegg
Train controlling and signaling system.....
..... F. P. Green
Trains running at full speed. Device for de-
livering and receiving news from the guards
of..... S. Schur
Tramways. Magnetic contact box for electric ..
..... A. Diatto
Transfer..... H. Sicard
Treating tank..... C. I. Goessmann
Trolley..... W. J. Rowley
Trolley..... T. F. Vailey
Trolley device..... R. P. Tisch et al
Trolling spoon or spinner..... P. J. J. J. J.
Truck bolster..... R. E. Powers
Tube cleaner..... D. C. Courtney
Tube cleaner..... W. Muller
Turbine..... E. John
Turbine..... G. Zahikjan
Turbine engine..... F. J. MacKenzie
Turbine motor..... F. S. Stevens
Turbine. Multicellular..... A. C. E. Ratan et al
Turbine wheel. Steam..... H. Zoelly
Turn table for cranes or the like..... R. Wilke

Type writer ribbon reversing mechanism.....
..... L. Myers
Type writer type bar basket..... L. Myers
Type writers, &c. Copy holder for carriages of ..
..... J. H. P. Colleen
Type writing machine..... C. Gabrielson
Type writing machine..... C. H. Shepard
Type writing machine work clamp or guard ..
..... R. J. Fisher
Type writing machine work guard.....
..... H. F. Eckert
Umbrella..... O. L. Fogle
Umbrella tip..... J. M. Laube
Underreamer..... E. Double
Upholstery spring support... 2 pats..... A. Hirsh
Valve..... J. E. Kordick et al
Valve..... J. Knowles
Valve for sanitary apparatus. Flushing.....
..... N. Curtis
Valve gear for hydrocarbon traction engines ..
..... F. A. & H. F. Klocksien
Valve. Pressure regulating..... J. W. Nethery
Vapor burner. Incandescent..... G. A. Bonelli
Varnish or color cup..... R. L. S. Doggett
Vegetable cutter..... G. M. Burnett
Vehicle..... H. L. Call
Vehicle brake..... C. E. Roberts
Vehicle exhaust relief. Steam..... A. A. Ball, Jr
Vehicle foot rest..... D. H. Morrison
Vehicle. Motor..... S. E. Freeman
Vehicle propelling means..... W. Flynn
Vehicle running gear..... J. Krauss
Vehicle seat..... G. W. Darling
Vending machine..... R. M. Green
Veneer or covering for wood or canvass, &c.
Composition of matter used as..... A. A. Turner
Ventilator..... W. J. Schumacher
Vessel loading or unloading apparatus.....
..... G. B. Airey
Vessels. Apparatus for recording speed of ..
..... J. S. Briggs
Violin bow attachment..... W. J. Keast
Vise. Folding..... M. D. Colt
Wagon attachment. Lumber..... D. W. Patterson
Wagon body..... W. Leppert
Wagon. Dumping..... J. T. Jope
Wagon. Dumping..... T. W. Jenkins
Wagon. Sprinkling..... E. D. Eastman
Wagons. Door and apparatus therefor for use ..
..... G. H. Sheffield et al
Wall. Concrete building..... A. I. Dexter
Walls or ceilings. Covering..... F. R. A. Sundull
Warp stop motion mechanism..... J. V. Cuniff
Washboard..... J. L. Conner
Water. Apparatus for the removal of sulfuric ..
..... H. Reiser
Water closet flush tanks. Ball cock for.....
..... W. O. Foss
Water column..... W. McComb
Water purifier. Rain..... G. Ritter
Water screen and filter..... S. Stout
Waterproofing or preservative purposes.....
..... E. M. Caffall
Weft fork..... T. Pickles et al
Weighing attachment for refrigerators.....
..... W. H. Mitchell
Weighing machine. Pressure..... S. G. Reed
Weighing tea. Apparatus for..... G. H. Driver et al
Well casing elevating device..... W. F. Hale et al
Well drilling machine..... F. R. & E. E. McKee
Well or cistern cleaner..... D. B. Jackson
Well swivel wrench. Oil..... J. Barrett
Wheel scraper..... L. F. Rogalla et al
Whiffletree hook..... L. F. Hughes
Winding machine thread guide..... J. O. McKean
Windmill..... W. Curtis
Window fastening device..... L. Monat, Jr
Wire hoop stretching machine..... J. P. Mitchell
Wood impregnating device..... W. Angus
Wood spitting machine..... O. E. Cheesbrough
Work and tool holder..... C. J. Rowe
Wrecking device..... W. J. & H. G. Cummings et al
Wrench..... J. E. Peterson
Wringer attachment..... J. D. Hiss
Yoke attachment. Neck..... D. N. Luse

DESIGNS.

Bath fixture. Shower..... J. H. Gavin
Coffee mill name plate..... J. M. Navarro
Cup..... M. Van Gelder
Glove..... F. Schmidt
Lamp shade..... J. Vanderbilt
Lamp shade..... 3 pats..... H. F. Avery
Paper. Wall..... 2 pats..... I. Leroy
Photographs, pictures, and illustrative matter.
Panel border for..... E. B. Eberle
Spoons, forks, or similar articles. Handle for ..
..... F. Habensack
Spoons, forks, or similar articles. Handle for ..
..... J. H. Hobson
Talking machine cabinet... 2 pats.....
..... L. F. Douglass

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Adding machine..... F. Buresh
Adding machine automatic attachment.....
..... H. Marshall
Agricultural implement..... J. Downing
Air and gas mixing and delivering apparatus.....
..... W. H. Brown et al
Air brake. Emergency..... W. H. Housberger
Air brake pump lubricator..... T. M. Henderson
Air compressor. Hydraulic..... W. O. Webber
Air into its constituents oxygen and nitrogen.
Mechanism for separating liquid..... H. Dumars
Air motor. Compressed..... E. W. Schloemer
Alkali chlorides. Apparatus for electrolytic ..
..... J. J. Rink
Automobile..... P. J. Collins
Automobile brake..... W. M. Paul
Awning roller..... C. H. Newell
Axle lubricator. Vehicle..... A. A. Peart
Axle structure for motor vehicles. Driving.....
..... T. J. Lindsay
Bag closure..... G. Winkler
Bale..... H. Stockman
Bale ties. Machine for forming hooks on wire ..
..... B. von Bultzingslowen
Ball swaging machine..... A. Johnston
Bars, rods, &c. Machine for dressing solid or ..
..... F. J. J. J. J.
Bearing. Roller..... S. J. Webb
Bearing. Shaft..... T. J. Lindsay
Bed. Extensible..... W. E. De Vault
Bed. Folding..... J. Loooy
Bed or couch bottom..... J. Hoooy

- Belt L. Wertheim
Bicycle frame E. F. Haag
Block signal system J. Weatherly, Jr
Blower, Steam I. A. Fraser
Boat, Life R. A. Brown
Boiler furnace, Locomotive or other A. F. Kingsley
Boiler superheater, Steam E. T. Hannam
Bolster attachment G. J. Friend
Book, Account J. H. Rand
Book, Manifold sales W. M. Kubon
Room swinging machine J. Bird
Bottle J. Auld
Bottle J. W. Wright
Bottle filling apparatus J. J. Clifford
Bottle, Non refillable M. Reinfeld
Bottle stopper T. Hentgen
Bottle stopper E. G. Howe
Bottle stopper holder, Water A. C. Eggers
Bottle washing machine J. J. Clifford
Bottles, jars, &c. Detector of the contents of A. J. Mottlau
Brake apparatus, Load H. R. Mason
Brake beam fulcrum L. A. Shepard
Brake shoe F. W. Sargent
Breach closing device, Eccentric screw P. de Nordenfeldt et al
Brewer's apparatus A. L. Neubert et al
Briquets, Making W. Hufelmann
Brush W. Braun
Brush, Fountain blacking S. W. Marshall
Bucket, Well C. A. Crane
Buckle, Cotton bale tie J. F. Matthews
Buckle, Harness A. W. & T. H. Nance
Buffing machine E. E. Winkley et al
Buggy boot C. Nelson
Buggy top W. A. Wilkins
Building block F. B. Henry
Building block O. H. Bolen
Burial basket W. C. Booth
Button A. P. Ward
Button blank cutting machine J. W. Miller
Calendering machine L. Eck
Camera, Photographic, 2 pats. F. W. Brehm
Can loader J. D. Martinez
Canning factory corn and syrup feeder J. M. C. Jones
Cap, Projectile C. V. Wheeler et al
Car body bolster, Railway J. M. Hansen
Car brake A. S. Hodges
Car brake W. House
Car brake W. J. Russell
Car coupling W. L. Jacoby
Car coupling D. P. Moran
Car coupling, Emergency B. B. Carlisle et al
Car door A. G. Abizaid
Car door, Grain M. Meehan
Car plow, Electric W. F. Taylor, Jr
Car, Railway C. Vanderbilt
Car seat H. Witte
Car seat B. Repsdorph et al
Cars, &c. Automatic guard or life saver for tram D. Maxwell
Cars, Combined friction and direct acting spring draft rigging for railway T. B. Hunt
Carpet stretcher T. J. & Z. T. Sheets
Carriage, Collapsible H. M. Hull
Cart, Dumping W. E. Harris
Cartridge, Blasting T. F. Durham
Case hardening compound J. Cadotte
Casein cellulose composition and producing same H. V. Dunham
Cask tilter G. Sanders
Cast off A. M. Ziegler
Cattle guard J. L. Campbell
Cell case H. Selsor
Cement, Manufacturing hydraulic J. Gresly
Cementitious product or artificial stone, Making W. E. Jaques
Centrifugal machine basket E. C. Knuchenmeister
Centrifugal machine, Electrically driven H. G. Morris
Chart or pattern for crochet work E. C. Faust
Chetelaine R. R. Debacher
Cider press G. L. Munk
Cigar box R. W. Hardie
Cigar box filler H. J. Lewis
Clasp M. B. Hammond
Clock case G. B. Woodruff et al
Clothes line fastener H. Klienfeldt
Clutch, Friction A. R. Anderson
Cob pipe filler J. H. Chapman
Cock and faucet mantle guard P. F. Glazier
Coffee urn F. Acker
Coin, Automatic apparatus for delivering articles in exchange for R. W. Vining
Coin sorter C. S. Batdorf
Coins, Machine for operating upon J. E. Dold
Coke drawing machine J. A. Hebb
Color blending wheel C. Scott
Concentrate L. R. Tulloch
Concentrator L. F. Schoenefeldt
Contact shoe W. F. Taylor, Jr
Conveyer, Pan J. M. Dodge
Conveyer, Pivoted bucket E. Bivert
Conveyers, &c. Tripper for bucket E. Bivert
Cope W. Leahy
Copper ores, Treating A. M. G. Sebillot
Corn ears, Machine for picking W. C. Sabin
Corn shocker T. L. Creath
Corset spring C. D. Wood
Cotton gin J. H. G. von Oven et al
Creaming can F. G. Fortney
Cultivator, weeder, and furrow maker Combined T. J. Hubbell
Currycomb D. M. Friedt
Currycomb T. A. Howes
Cuspidor C. E. Bertels
Digns, ornamentations, or letters on articles, Material for producing R. K. Duncan
Developing and fixing device, Pocket R. R. Lutz
Diaphragm indicating, controlling and measuring appliance J. Grouvelle et al
Dish washing machine J. H. Griswold
Disinfectant receptacle W. L. McDonald
Display truck, Couch H. J. Montgomery
Distance or range finding instrument T. Adamson
Door closer and check E. Cliff
Door gage D. Millsbaugh
Door opening and closing device, Mechanical W. F. & J. Drieschman
Door operating mechanism L. A. Shepard
Door or window trimming F. C. Walbridge
Door support, Adjustable sliding T. C. Prouty
Dough or like plastic materials, Apparatus for dividing and compressing or molding J. Callow
Draft equalizer J. B. Hayden
Draft evener F. Rosenow
Drafting appliance, Garment J. Robertts
Dredging machine W. H. Smyth et al
Drying moist material, Apparatus for E. N. Trump
Dumping apparatus C. G. Foote
Duplicate engine J. W. Neil
Dynamo or motor with alternating field, Electric R. Ziegenberg
Ear C. E. Carl
Electric arc for heating and lighting, Apparatus for producing J. I. Ayer
Electric circuit closer and breaker T. H. McQuown
Electric coupling G. A. Le Fevre
Electric motor switches, Automatic brake for controlling F. A. Muschenheim et al
Electric signal B. H. Scott
Electrical cut out C. B. McPherson
Electrodes for storage batteries, Producing F. A. Feldkamp
Electrolier, Adjustable G. Andersen
Elevator boots, Device for relieving choke in I. Lutz
Elevator fender H. L. Conary
Embroidering machine M. Escuder et al
End gate J. M. Groff
Engine feed regulator, Gasoline H. H. & C. B. Segner
Engine reverse motion, Steam F. Meanley
Engine wheel, Traction H. F. Krueger
Engines, Fuel feed device for gasoline or vapor E. Prouty
Engines, Gas generating and feeding mechanism for gas C. K. MacFadden
Envelop or card delivering cabinet T. A. Matthews
Envelop, Safety J. F. Young
Ether, Manufacturing O. Meyer
Exhibiting mechanism, Animal W. D. Carson
Fabric cutting machine H. Faltermayer
Fabric marking machine M. J. Fisher
Fastening device, Barbed R. W. Meily
Fat cutter C. Burnett
Feed trough J. J. Smith
Feed trough attachment T. L. Peacock
Fence post G. W. Todd
Fence post H. Hansberger
Fence post J. K. Harris
Fence structure S. L. Bailey
Fence, Wire S. S. Withington
Fertilizer distributor and cotton planter I. C. Clyburn
File, Combination credit W. D. Mitchell
File, Paper C. C. Boykin
Filter R. J. Goade
Filter press E. B. Hack
Finger nail clipper H. C. Hart
Firearm C. J. Hamilton
Fish catcher H. C. Reichardt
Fish nets, Means for facilitating casting and drawing L. Elinson
Fish trap D. B. Roberts
Floor drain and backwater trap, Combined F. C. Edelen
Floors, paneling, &c. Fastening means for parquet W. S. Kelsey
Fodder fork W. Giles
Folding or collapsible box of cardboard, &c A. R. Buckton
Folding table H. Johnson
Food cutter C. J. Shirreff
Furnace C. J. Andrus
Furniture tip L. C. Matlack
Fuse, Electric circuit T. Nagel
Game apparatus J. J. Wyly
Game apparatus H. Rammie
Game board L. J. Magie
Garment fastener J. C. Christensen
Gas, Apparatus for the manufacture of R. Dempster
Gas burner A. E. Howard
Gas engine W. R. Kahlenberg
Gas, Generating F. H. Bates
Gas generator H. W. Webb
Gas generator, Acetylene W. D. Packard
Gas generator, Acetylene H. W. Webb
Gate J. Meyer
Gate automatic attachment J. H. Jones
Gear, Variable speed and reversing H. C. Sheppard
Gear wheel F. A. Richter
Gelatinous product and producing same, Insoluble H. V. Dunham
Glassware, &c. Ornamented or lettered R. K. Duncan
Glue from hides, Making E. R. Hewitt
Go-cart F. E. Southard
Go-cart or child's chair J. Weber, Jr
Golf ball, &c C. J. Grist
Governor and speed gear mechanism, Combined N. V. Johnson
Governor, Engine E. Hudson
Governor regulator C. J. Koch
Grading machine B. A. Karr
Grain binder C. Colahan
Grain drill H. Funk
Grain shoe, Self-adjusting J. T. Jardine
Grinder, Twist drill A. H. Reimann
Grinding machines, Apparatus for feeding abrasive material to I. Flexner
Hand press J. F. Helms
Harness J. L. Haller et al
Harrow H. A. Brixen
Harvester J. C. Parker
Harvester binder tension device, J. F. Harnish
Hat, Sportsman's convertible, 2 pats. E. E. Hodshon
Hay knife W. S. Shippey
Heater C. R. Bannier
Heating apparatus J. C. Nace
Heating system, Electrical E. H. Kitfield
Hedge W. Fehr
Hinge, Gate J. H. Vandever
Holdback, Breaching strap T. Nichols
Horse head controller B. W. Kindig, Jr
Horse shoe nails, Machinery for the manufacture of J. M. Laughlin
Hose coupling J. Jeffery
Hose, Manufacturing H. H. Shepard et al
Hot water and steam, Apparatus for supplying F. J. Connell
Hub attaching device S. S. Thomas
Hydrocarbon burner C. A. Hammel
Hydrocarbon burner J. A. Walkley
Hydrometer H. E. Broestler
Hydroxids and oxids of metals by electrolysis, Production of F. F. Hunt
Ingots or like pieces under the hammer, Machine for handling G. P. Toy
Illuminating body M. Korff
Inkwell S. G. Reynolds
Internal combustion engine E. Korting
Invalid sling P. W. Atkinson
Jar closure C. H. Nicholson
Jars, &c. Packing ring for fruit G. D. Coddington
Jars, &c. Stoppering device for preserve H. Martini
Knitting machine, Circular H. A. Houseman
Lacing P. J. Congdon
Ladder, Extension M. J. Lewis
Lamp burner attachment W. B. Stockmar et al
Lamp burner, Central draft J. Gregory
Lamp, Electric arc L. Wirtz et al
Lamp, Electric arc, 4 pats. E. H. Belden
Lamp extinguisher H. D. Hinks
Lamp hanger, Extension F. H. Geisler
Lamp, Miner's safety M. G. Moore et al
Lamp socket, Incandescent electric H. A. Framburg
Lamps, Magnetic lock for miners' safety A. Wiedenfeld
Latch, Door R. J. Quick et al
Laundry, Portable W. A. Roberson
Leg fastening A. Ow
Lifting jack M. M. Moore, Sr
Lifting jack W. C. Smith
Liquid meter A. S. Drisko et al
Liquid mixing and spraying apparatus W. H. Millsbaugh
Liquors, Clarifying E. R. Hewitt
Load retaining stakes, Position governing means for 2 pats. W. M. Cain
Lock E. Muhlinghaus
Locomotive signaling apparatus H. Stadelmann, Jr
Loom shuttle and quill, Narrow ware E. H. Sawyer
Malt turner and aerator J. Mueller
Marker, Stock L. J. Davis
Marking and cutting device C. C. Stange
Marking tool, Cattle H. A. Jones
Marlinespike H. Fesenfeld
Match safe J. R. Thomas
Match safe and lighter C. F. A. Cammann
Measure, Liquid H. J. & J. C. Brantley
Measures and funnels, Automatic valve for combined E. D. Schafer
Measuring tank, Liquid E. O. Linton
Megaphone C. Melville
Metal beating machine F. W. Grempler
Metal boring tool F. W. Taylor et al
Metallic formed sheet J. H. Murphy et al
Meter registering mechanism L. H. Nash
Milk can W. J. Snow
Mining hoist safety appliance J. Lewis
Mold J. F. Spencer
Monkey wrench N. D. Fairchild
Motion transmitter V. J. Dolechek
Motor sparking plug J. S. Foley
Music turner, Sheet J. W. Collier
Musical instrument self playing attachment J. Courville
Musical instrument tracker bar J. T. Sibley
Noodles, &c. Machine for cutting C. Hurt
Nozzle J. Hueni
Nut lock S. C. Crow
Nut lock A. C. Fletcher
Nut, Lock W. C. Peters et al
Oil supply system H. C. Hanson
Optometrist's trial frame C. L. Hogue
Ornamented or lettered articles, Manufacturing R. K. Duncan
Oxalates, Making F. Rieche et al
Pad hook O. H. Muntz
Paper from old newspapers, books, magazines, &c. Making W. B. Meixell
Paper handling machinery, Sheet calendering device for T. C. Dexter et al
Paper machine H. A. Moses
Paper making machinery H. Parker
Paper sheets, Device for holding or binding loose or removable R. G. Whitlock
Paper tube making machine C. Frerot
Pastboard making machine P. Priem
Pencil sharpener H. L. Adams
Pen holder C. J. Dahlgren
Pessary F. L. Priest
Pianos, Action for mechanical playing attachments for G. S. Williams
Pick, Mining G. T. White
Pile point R. S. Davis
Pin hook G. W. McGill
Pipe bending machine H. F. Condon
Pipe elbow machine J. Baumle
Pipe joint, Lead G. Bryar
Pipe joint or coupling 2 pats. A. Spratt
Piston joint G. C. E. de Bonnechose
Planter marker lifter, Corn E. E. Harter et al
Plow attachment E. H. Allman
Plow, Disk O. E. Ellison
Plow, Ditching J. S. McCants
Plow or cultivator W. B. McKintley
Plow, Reversible H. F. Kreuter
Plow, Sod cutting J. F. Weber
Printing book backs, Machine for W. P. Northcott et al
Printing device for mechanical movement O. Tyberg
Printing machine J. H. Reinhardt
Printing machine rollers, Machine for cleaning E. T. Cleathero
Printing machine, Stencil W. D. Sternberg
Printing press C. H. Johnson
Printing press automatic controlling mechanism T. C. Dexter et al
Printing presses, Metal holding apparatus for flatbed lithographic W. J. Leyer
Printing surfaces, Mechanism for preparing B. A. Brooks
Pulley covering J. F. Webb
Pump, Air G. W. Kellogg
Pump, Duplex P. F. Oddie
Pump or vacuum chamber, Automatic suction C. H. Wetlin
Pumping engine G. De Laval et al
Punching and shearing machine, &c. R. Norrie
Quartz mill C. J. Hodge
Rail and conductor point operating mechanism C. G. Goord
Rail cover, Third H. F. Duffy
Rail joint A. L. Vinayard
Rail joint for tracks and especially for field railways W. Weiss
Rail protector, Third H. F. Duffy
Railway block signal and switch W. F. Taylor, Jr
Railway, Electric, 2 pats. C. J. Kintner
Railway rail and joint therefor J. Mallat
Railway safety system, Electric C. J. Kintner
Railway service safety device E. B. Kintner
Railway switch operating device, Street H. T. Young
Railway switch, Switch W. J. Bell
Railway system, Electric W. M. Eader
Railway tie J. Horst
Raising or hoisting apparatus E. Lorin
Raker gage and jointer J. P. Olson
Range hot water heater, Kitchen P. H. Werner
Reaper evener L. Krauss
Recording instrument record sheet W. H. Bristol
Register face plate, 2 pats. H. J. Valentine
Register top plate H. J. Valentine
Rivet holder E. F. Terry
Rock drill, Power driven W. A. Box
Rock drilling machine A. Fauck
Rolling pipe couplings, &c. Machine for H. W. & J. A. Hock
Rosette covers, Device for removing F. L. Bryant
Rotary engine P. A. Anderson
Rotary engine A. Guindon
Rotary motor J. M. Benjamin
Rubber dam clamp F. H. Nies
Ruling machine K. Daut
Sad iron, Revolving A. D. Mahony
Safety can W. H. Pearson
Satchel J. Sandberg
Saw sharpening machine A. Andersson
Saw swage gage A. O. Reppeto
Scoop T. D. Owens, Jr.
Scouring machine A. Pietsch
Screw driver G. E. B. Parkin
Sew machine G. Sittman et al
Seed huller S. J. Ellis
Semaphore mechanism W. F. Taylor, Jr
Sewing machine thread cutting device E. B. Allen
Sewing machine threading device S. B. Battey
Shade bracket F. J. Nichols
Sharpeners, Disk F. Melvin et al
Sharpeners, Disk E. Pierson
Sheaf tie J. C. Parker
Sheep dipping machine R. J. Winnie
Sheet pole support E. G. Lamb
Sheet metal wares, Machine for beading J. W. Paton et al
Shock binder P. H. Fontaine
Shuttle 3 pats. C. & G. Brun
Shuttle D. J. Carey
Shuttle threader O. R. Jacques
Signal system, Electric H. A. Fessenden
Signaling apparatus, Automatic I. A. Michael
Signaling apparatus, Wireless L. de Forest
Signaling device, Wireless L. de Forest
Sleeves, couplings, or the like, Machine for forming A. A. Anderson
Slotting machine L. H. Colburn
Solar heater J. M. Browning, Jr
Soldering iron, Electric J. I. Ayer
Sound record, Double faced A. N. Petit
Sound reproducing record and making same T. A. & J. B. Connolly
Spacing table L. D. Weaning
Square, Carpenter's folding W. Steers, Sr
Squares, Machine for rolling carpenters' H. K. Jones
Stack covering W. D. Carson
Stacker, Pneumatic E. O. Berg
Stacker, Pneumatic straw N. L. Nelson
Stamp mill attachment L. R. Tulloch
Stationary cabinet T. A. Matthews
Steam boiler S. L. Marple
Steam superheating means H. F. Wallmann
Steam trap W. M. Still
Steel and ingot-iron, Manufacture of B. Talbot et al
Steel, Angle H. G. M. Howard
Stereoptics, magic lanterns, &c. Slide-carrier for H. W. Force
Stereoscope W. F. Folmer et al
Stereoscope lens-setting H. C. White
Stereotype block C. N. Field
Sterilizer A. Castle
Stone, brick, &c. Waterproofing and finishing the surface of N. Farnham
Stone molding machine, Artificial J. Sinclair
Stove F. J. Ploch
Stove C. Schweizer
Stove C. D. Helwig et al
Stove, Heating J. T. Smith
Stove, Heating N. R. Spaulding
Stove, Magazine G. E. Kendall et al
Strainer G. L. Wackerow
Switch W. F. Taylor, Jr
Switch operating device J. T. Carmody, Jr
Switch throwing mechanism W. F. Taylor, Jr
Telegraph apparatus F. G. Creed
Telegraphic receiving apparatus F. G. Creed
Telegraphy, Perforating F. G. Creed
Telephone book support and note paper supply device, Combined A. D. Irving
Telephone exchange N. E. Norstrom
Telephone transmitter C. F. Bennett
Tent A. F. McGrath
Testing machine, Coin controlled C. E. Amund
Thermometer shield, Clinical F. O. Koenenman
Thill coupling H. C. Ingraham
Threading device S. B. Battey
Ticket, Pin M. S. Johnson
Tiles, Interlocking building J. Schall
Time recorder H. F. Shilling et al
Tire cover, Elastic C. H. Gray et al
Tire for vehicles, Spring A. C. Schwieger
Tire rolling machine P. Eyeremann
Tires in rim channels, Tool for seating rubber W. S. Jacobs
Tobacco pipe I. L. Hauser
Toboggan slide B. B. Floyd
Tongs, Household J. H. Spangler
Tool and back rest holder B. M. W. Hanson
Tool, Electrically heated J. I. Ayer
Tool holder B. M. W. Hanson
Tool or cement house, Portable W. H. McDonald
Tool, Pneumatic R. L. Ambrose
Tools, Apparatus for controlling current supply to electrically heated J. I. Ayer
Torch, Safety C. H. Brown
Torpedo, Automobile F. M. Leavitt
Towel rack P. H. Germain
Towel rack E. D. Mullen
Traction wheel, Metal A. C. Rogers
Train orders, messages, &c. Device for delivering W. H. Pickett
Transferring and printing J. E. Hesse et al
Transmitter E. E. Yaxley

Treating material..... E. N. Trump
Trolley harp..... E. D. Rockwell
Tube or roll forming machine..... C. Surmann et al
Tunneling apparatus..... R. Stone
Turbine..... H. Wolke
Type holder..... H. S. Folger
Type mold..... C. R. Murray
Type writer..... N. L. Anderson
Type writer carriage construction..... J. Alexander
Type writing machine..... W. J. Barron
Type writing machine..... 2 pats..... O. Tyberg
Type writing machine..... C. H. Shepard
Umbrella..... J. B. Bohrer
Valve. Fluid pressure motor..... C. A. Carlson
Valve gear. Engine..... G. F. Conner
Valve. Hydraulic..... W. G. Ward
Valve. Hydraulic..... C. E. Lewis et al
Valve. Locomotive relief..... K. Rushton
Vehicle brake..... F. Treloar
Vehicle brake..... W. U. Wadsworth
Vehicle brake..... M. Jewell
Vehicle. Motor..... L. Renault
Vehicle seat..... G. R. Brown
Vehicle steering gear. Motor..... L. Renault
Vehicle wheel..... C. Andersen et al
Vehicle wheel..... F. E. Southard
Vending machine..... E. S. Scheble
Vending machine. Coin controlled perfume..... A. J. Richie et al
Vertical boiler..... G. F. Spencer
Vessel mooring and warping device..... J. Kidd
Wardrobe. Clothes..... R. Weir
Warm air furnace..... O. L. Badger
Warm air register..... T. E. Hunt
Watch bow fastener..... J. H. Rogers
Watchcase..... W. W. Dudley
Water. Apparatus for separating oil or grease from..... C. Oliver
Water closet seat..... C. P. McElroy
Water meter..... L. H. Nash
Water meter. Disk..... J. P. Kelly
Water tube boiler..... G. R. F. H. Cuntz
Water wheel governor..... M. P. Schenck
Wave motor..... J. A. Langstroth
Weave for shades, &c..... A. C. Hough
Weighing apparatus. Automatic..... W. Northrop
Weighing machine. Automatic..... W. Brough
Weighing machine. Automatic..... J. F. Clarke
Weighing scoop..... H. H. Fox
Welt making machine..... G. E. Rollins
Wheel..... J. B. McMullen
Wheels. Peripheral structure for..... F. Pawel
Winding machine..... C. H. Knapp
Windmill..... J. Stanley
Windmill..... G. P. Rasck
Window lock..... W. Dink
Window parting strip..... C. W. Wright
Window Revolvable..... E. C. Somers
Wire connector..... J. S. Ford
Wire covering machine. Flat..... J. C. Anderson
Wire stretcher..... C. Bush
Wood carbonizer..... F. M. Perkins
Wood. Treating..... K. Wadamori
Woodworking machine chip breaker..... C. D. Marsh
Wrench..... A. L. Vinyard
Wrench..... N. C. Hyman
Yeast extracts. Preparing alimentary M. Elb

DESIGNS.

Buckle plate or similar article..... C. C. Penfold
Charm or similar article..... R. E. Fisher
Comb. Pompadour puff..... B. W. Doyle
Comb. Pompadour puff..... F. H. Rowley
Spoons, forks, or similar articles. Handle for souvenir..... J. E. Straker, Jr
Type. Font of..... W. D. Orcutt
Watch charm..... N. B. Levy

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Acid. Acetyl para cresotinic..... B. R. Seifert
Adding machine..... L. Cerf
Advertising display device..... D. Jones
Air brake systems. Supplemental auxiliary feed for..... J. J. Jones et al
Amusement and advertising device..... M. W. Beemer
Apparel. Wearing..... E. G. Runyan
Automobile flue shield and lamp support combined..... L. C. Savale
Automobiles or the like. Speed controlling mechanism for..... C. C. Riette
Awning frame coupling..... A. D. Campbell
Axle box dust guard. Car..... E. E. Saver et al
Axle boxing. Vehicle..... G. W. Davis
Bag fastener..... 2 pats..... B. vom Eigen
Bag frame handle..... B. vom Eigen
Bags. Manufacture of..... 2 pats..... J. R. Collins
Bags, &c. Suspending attachment for game..... G. F. Clarke
Baking powder..... G. L. Teller
Bale wires. Machine for bending the cross-heads of hay..... H. P. Wilson
Ball and socket fastener..... M. Sternberg
Barrow wheel..... C. E. Knoch
Basin. Catch..... W. Aylward, Jr
Battery tanks or cells. Skeleton frame for electric..... D. F. Jones
Bearing. Combination ball and roller..... H. V. Hillcoat
Bed chair or bed sofa..... H. A. Linderoth
Bell. Electric..... H. E. Dey
Bench shears..... G. J. Capewell
Bicycle with rowing attachment..... L. Batchelor
Binder. Loose leaf..... G. A. Roedde
Blind fitting. Window..... E. C. Harris
Block signal system. Electric..... L. C. Werner
Boat..... A. Viert
Boiler attachment. Steam..... T. Mills
Boiler tubes or stay bolts. Fastening for steam..... M. M. Massey et al
Bolster..... F. S. Ingoldsbey et al
Bolt holding implement..... J. S. Scott
Book holder..... B. T. Steiner et al
Bookcase..... D. Cree et al
Bottle. Non refillable..... H. Hahn
Bottle. Non refillable..... H. Kahlmus
Bottle. Non refillable..... E. C. Luks
Bottle. Non refillable..... G. C. Bessonet
Bottle stopper..... J. A. Jones
Box..... B. vom Eigen
Box making machine..... W. H. Butler
Bracket or other ornament..... W. F. Simon
Bracket..... J. Gardiner

Braiding machine racer..... C. W. Hassler
Brake apparatus. Automatic fluid pressure..... M. Corrington
Brake beam..... R. P. Lamont
Brake block shoe..... M. Potter
Brake mechanism. Automatic fluid pressure..... M. Corrington
Brick cut off table..... W. H. Beltz
Brooder..... C. F. Adair
Brush..... A. Schickler
Brush. Combined hat and clothes..... C. Lashlie
Bucket. Clam shell. reissue..... S. Swedenberg
Buckle..... C. E. Smith
Butter. Testing..... M. Voghter
Button. Cuff..... W. Doherty
Calculating machine..... D. E. Felt
Calendar..... B. Rosenfeld
Calendar..... J. A. Cheape
Camera plate holders. Releasing device for magazine..... J. C. Fyfe et al
Can..... J. J. Shannon
Can opener..... C. A. Ford
Cap closure. Rotary..... H. J. S. Hall
Car brake..... D. W. Copeland et al
Car. Convertible..... M. Power
Car coupling..... H. F. Welsh
Car coupling..... 2 pats..... E. C. Washburn
Car dratt connection. Railway..... C. S. Payne
Car interchangeable draw gear. Railway..... F. L. Clark
Car side bearing. Railway. reissue..... C. F. Hutton
Carbon articles. Making..... E. G. Acheson
Carbureting device. Explosive engine..... L. P. Mooers
Card feeding machine..... D. H. Waters
Carpet stretcher..... J. M. Brown
Cart. Dumping..... J. Hovas
Centering machine controller or stop bar..... E. L. Vold
Centering mechanism..... J. S. Bancroft
Centrifugal machine..... M. de Marcheville
Chair foot rest..... G. A. Bowen
Chair head rest. Shaving..... C. E. Haeg
Checking or unchecking device..... A. E. Fisher
Checking the output of machinery. Apparatus for..... L. Lenot
Chopping device..... H. Brenstein
Clip..... E. De. Lamater
Clock. Electric striking..... W. Olson
Closure..... E. E. Chapman
Clothes line fastener..... C. F. Smith
Clothes pin..... A. Smith
Clutch mechanism. Reversing..... W. J. Wright
Coal carrying vessel or bag. Manual..... N. R. Marshman
Coal, &c. Depository for..... G. C. Mackrow et al
Coal hanger..... K. Eyles
Coffee treating machine..... T. R. Timby
Collapsible tube and spreader. Combined..... C. L. Huddle
Collar clasp..... J. Clement
Collar clasp..... N. W. Travis
Comb..... W. S. Bechtold
Comb..... A. W. Cummins
Composite board for doors, panels, &c..... J. S. Anderson
Concentrator..... D. M. Story
Condenser. Steam..... W. F. Fricke
Condensing coil..... R. Whitaker
Controller and brake operating mechanism. Combined..... H. Sawyer
Conveyer. Waste end..... H. Kemp
Cooker. Steam..... W. L. Liggins
Cooker apparatus..... J. F. Rabe
Cooking utensil..... M. T. B. Washington
Cooking utensil..... S. L. Treen
Copy holder..... L. Henderson
Corn husker. Adjustable hook..... G. W. Sues
Corn shock tier..... D. H. Zuck
Corset..... E. Pohl
Cotton stalk puller..... C. R. Smith
Couch..... J. Hoey
Coupling support..... E. C. Washburn
Crank and crank shaft mechanism..... C. E. Ellicott et al
Cream separator..... J. Mersman
Cultivator..... F. J. Ziegler
Curling iron heater..... O. Walsh
Currycomb..... E. B. Webb
Curtain hanging..... W. P. Powell
Curtain stretcher..... J. W. Reed
Decorticating machine..... H. A. Clifford
Dental bar..... P. B. McCullough
Denture plates, &c., antiseptic. Rendering..... L. Elertsen
Derrick swinging mechanism..... C. A. Baechtold
Desk. Convertible table..... T. M. McKee
Display rack..... J. F. Theiss
Display stand..... 2 pats..... F. C. Mason
Distilling apparatus..... J. M. Moore
Distilling apparatus..... A. C. G. Dupuis et al
Dock. Floating..... A. C. Cunningham
Door and sash fastening device..... V. Bail
Door opener..... G. L. Thiege
Dovetailing machine..... H. S. Spencer
Draft rigging..... H. C. Williamson et al
Draw head support..... H. E. Welsh
Drawer pull..... D. W. Tower
Drill..... W. N. Shotwell et al
Drill bit. Rock cutting..... L. Durkee
Drill rod clamp..... T. E. Morris
Driving mechanism..... C. C. & E. A. Riette
Dye and making same. Dark blue wool..... M. Hoffmann
Eaves protector..... G. M. Bohnert
Electric furnace..... 2 pats..... L. W. Stevens et al
Electric heater..... G. J. Peacock
Electric motor control..... S. T. Dodd
Electric wire conduit bond..... G. A. Lutz
Electric wire conduit elbow..... G. A. Lutz
Electrical controlling apparatus..... J. D. Ihlder
Electrode..... R. Hager
Elevator..... N. Hiss
Elevator door..... E. McClure
Elevator safety appliance system. Electrically actuated..... H. G. Wright
End gate, shovel board, and live stock chute. Combined..... W. B. Hanlon
Engine synchronizer. Duplex..... E. M. Coryell
Evaporating apparatus..... W. Greiner
Exercising ball..... J. S. Aydelott
Extension table..... H. Nonnast et al
Fascine..... H. F. Kellner
Fence post and electrical conductor..... C. E. Griffin et al
Fence post base..... R. C. Jr., & W. A. Stewart
Fertilizer distributor..... O. W. & L. E. Siebenhaar
Fertilizer distributor..... E. C. & H. L. Litchfield
Film bath..... H. S. Applegate
Filter..... W. Noles

Fire alarm. Automatic and manual..... W. L. Denio
Fire alarm circuits. Automatic non interfering repeater for..... W. H. Kirman
Fire escape..... J. Spiro
Fire escape..... M. Hirsch
Fire extinguisher..... G. C. Hale
Fire pot..... G. G. Kniffin
Fires. Extinguishing..... E. Gates
Firearm. Breech loading and discharge actuated..... S. N. McClean
Firearm. Revolving..... A. L. Mollett
Firearm single trigger mechanism..... E. D. Fulford
Floor, sidewalk, roof, or like support..... P. H. Jackson
Flooring ends. Machine for trimming and matching..... E. J. Fulghum
Fluid meter..... A. S. Tuttle
Folding table..... W. J. Marrett
Food. Making cereal malted..... J. D. Bourdeau
Food products. Preparing rice..... J. W. Johnson et al
Fruit drier..... H. E. Smith
Fruit pitting and stuffing machine..... L. Middlekauff et al
Fuel feeding device..... G. W. Limbert
Furnace..... L. W. Stevens et al
Furnace for melting steel, &c. Movable swinging body..... L. Rousseau
Furnaces. Apparatus for heating air for supplying blast..... G. Telchgraber
Furniture..... M. E. Stockwell
Fuse. Projectile..... H. Dehke
Game apparatus. Coin controlled..... C. Molitor
Garbage crematory..... L. F. Decarie
Garden implement..... J. B. Bomberger
Garment fastener..... N. W. Perkins, Jr
Garment fastening device..... J. V. Washburn et al
Garment hanger..... E. Shoemaker
Garment supporter clasp..... C. Andresen
Gas burner..... F. H. Allen
Gas burner. Air..... L. Denayrouze
Gas burner igniting device. Acetylene..... H. C. Thomson
Gas burner. Incandescent..... G. Grice et al
Gas generator. Acetylene..... F. L. Irish
Gas. Manufacture of..... W. A. Koneman
Gate..... O. L. Compton
Gate fastener..... P. Mast
Gear cutting machine..... H. Bilgram
Gear teeth. Shaping..... H. Bilgram
Gear. Variable speed..... T. W. Barber
Gearing. Multiple speed..... W. J. Hagman
Glass. Cooling retarder for drawing..... L. Thornburg
Glass or like substances. Beveling..... C. L. Goehring et al
Glove fastener..... A. Leblanc
Grain cleaner and separator..... E. R. Draver
Grain scourer and dust collector. Self contained..... E. R. Draver
Grain transporting and weighing apparatus..... G. W. McNear, Jr
Grass destroyer..... B. J. Huck
Groove cutter..... J. Barnes
Gun. Air..... W. R. Benjamin
Gun barrel..... W. Rost
Gun or firearm..... F. Tobisch
Guns. Means for controlling the recoil of..... S. N. McClean
Harrow..... B. F. Brakebill
Harrow tooth fastener..... C. M. Ripberger
Harvester. Clover..... A. D. Miller
Harvester. Corn..... E. A. Johnston
Harvester grain guide..... W. Glaze
Hat fastener..... L. Vihon
Hatch fastener..... W. H. Crawford
Hay press..... J. C. Dameron
Heat regulating apparatus..... N. E. Nash
Heating and lighting apparatus..... G. Imbert
Heating apparatus..... E. M. Warren
Heating apparatus. Electric..... R. Kuch
High potential switch..... J. F. Kelly
Hinge..... D. W. Tower
Hinge. Door..... J. R. Hartman
Hinge. Mine door..... T. Jeffrey
Hoisting and conveying apparatus..... O. & J. Johnson
Horn like material from raw skins. Preparing..... E. Jetter
Horse blanket..... L. H. Ayres
Horse eye protector..... L. A. Southern
Horse shoe calk..... J. Abbs
Horse shoe. Elastic tread..... A. W. Jones
Hose coupling..... J. Ballenberger et al
Hose coupling..... E. E. Gold
Hose coupling..... H. S. & H. S. Patterson
Hose signaling apparatus. Electrical..... W. G. Seeley
Hub. Ball bearing wheel..... B. P. Youmans et al
Hub. Vehicle..... P. Jenness
Hydrant system for country houses..... J. Johnson et al
Hydraulic motor..... D. McIntyre
Ice cream freezer. Continuous..... H. J. Gerner
Ice creeper..... J. E. Toscan et al
Ice pick..... J. M. Dieterle
Incubator..... J. H. Boyd
Incubator egg tray..... C. E. Adair
Ingot and forming same..... H. W. Lash
Inkstand..... H. A. Johnston
Insects from plants. Machine for collecting..... B. F. Johnson
Insulated support for wires..... L. Steinberger
Insulating material for other purposes. Compound applicable for..... L. M. Randolph
Insulator..... L. Steinberger
Iron founding..... A. Cochran
Ironing board..... L. I. Buehl
Jar closure..... O. N. Hoffman
Jar neck and closure..... A. Smelker
Keg washing apparatus. Beer..... F. Schmidt
Key filing device..... C. F. West
Kiln..... D. J. Marrs
Kiln..... J. F. Warwick
Kinetic energy machine..... E. L. N. Denis
Kinetic film..... T. A. Edison
Knitting machine needle..... J. C. Egly
Knitting machine stitch cam..... E. A. Hiner
Lacing. Shoe..... E. C. Luks
Lamp. Electric arc..... G. R. Davison
Lamp. Miner's electric..... H. G. Prested
Lamp regulator. Incandescent..... F. C. Schofield
Lamps with mantle hanging downward. Bunsen burner for incandescent gas..... H. W. Hellmann
Lasting portions of boot or shoe uppers..... O. C. Davis
Lathes. Variable speed mechanism for..... W. Lodge

Ledgers, account books, &c. Lock for the adjustable backs of loose leafed..... A. D. Hulquist
Lemon squeezer..... D. H. Mosteller
Letter box..... G. E. Benton
Letter clip and blotter. Combination..... L. Pratt
Lifting jack and thill support..... J. H. Kingsbury
Lightning arrester..... W. E. Cone
Liquid cooler..... J. L. Steitz
Liquid cooler..... O. Roderwald
Liquid trap. Non siphoning..... J. J. Tokheim
Loom filling detecting mechanism..... E. Cuniff
Loom pile wire motion..... H. K. Martin
Loom shuttle..... A. Baldwin
Lubricator..... T. A. Delaney
Mail or letter box..... P. S. Dusenbury et al
Mandolin pick holder..... B. F. Kneil
Mandrel. Expandable..... A. Kneil
Massage. Electromagnetic device for vibratory..... E. K. Muller
Massage instrument..... N. Jacobsen
Match box..... H. A. Dodge
Match box..... G. Agobian
Match safe. Single delivery..... W. F. Carlberg
Match stock preparing apparatus..... W. H. Parker
Measuring the flow of oil in pipes. Apparatus for accurately..... L. P. Lowe
Medicated tampon..... E. M. Pond
Metal bars and beams. Attachment for uiting..... C. T. Purdy et al
Metal grinding or polishing apparatus..... L. G. Forwood
Metal rods. Machine for shearing blanks from..... J. P. Wennersten
Mining. Hydraulic gold..... F. J. Hoyt
Miter box..... J. A. Traut
Molder's flask..... W. Lotz, Jr., et al
Motor control..... S. T. Dodd
Mowing machine cutter bar..... W. W. Jones
Music leaf turner..... P. & F. C. Engelking
Music recording and self playing mechanism..... R. A. Gally
Musical instrument cases. Bow holder for..... F. A. Faulhaber
Musical instrument speed regulator. Mechanical..... H. P. Ball
Muzzle for calves or colts..... W. M. Vancuren
Napkin attaching device. Sanitary..... C. H. Schopbach
Necktie retainer..... M. C. Lewellyn
Nozzle and joint. Hydraulic..... J. A. Yeatman
Nozzle for discharging liquids..... E. Shaw
Nut lock..... J. W. Church
Nut lock washer..... E. E. Brown
Oiler. Windmill..... S. E. Burke
Oils. Treating..... F. B. Pope
Ore grinder..... W. G. Phipps
Ores. Lixivating..... P. Naef
Orrery..... J. P. Wesson
Outlet box..... H. Krantz
Painting apparatus. Wheel..... W. B. Long
Paper and making same for obtaining fast copies from writings of anilin inks..... M. H. Chapin
Paper bag machine..... E. Quenard
Paper clip..... G. B. Dusenberry
Paper or other fabrics. Machinery for cutting and folding..... E. H. Cottrell
Paper sack holder..... W. E. Burks
Parcel grip..... A. H. Brownley
Pasteurizing..... M. L. Fesenmeier
Pen wiper..... A. C. L. Chapman
Pencil sharpening device..... W. S. Doe
Perforating machine..... E. A. Trussell
Perforating or punching apparatus..... R. Kronenberg
Petroleum storing reservoir..... P. Englund
Photographic shutter..... T. Bueck
Picture frame..... E. Servuss
Picture frame..... E. Schievenbusch
Picture mounting leaf or book..... A. W. Eugel
Pie plate rim. Supplemental..... G. L. & M. P. Blackman
Pile fabric. Double..... F. Pearson
Pipe..... J. H. Taylor
Pipe and jointing same..... W. Thorpe
Pipe fitting..... P. J. Madden
Planter..... A. G. Myers
Planter and marker. Combined corn..... A. DuBach
Planter. Seed..... S. A. Grier
Planters. Ground marking device for corn..... H. Rockman
Plastic material packing machine..... J. C. Thom
Plow..... T. O. Tollack
Plow. Disk cultivator..... E. B. Lee et al
Plow evenner. Five horse gang..... J. W. Gamble
Plow. Garden..... G. W. Cole
Plow handle clamp..... S. C. Drake
Plow. Listing..... E. C. Bassford et al
Plow. Sulky..... F. L. Averill
Pneumatic despatch system..... B. C. Batcheller
Pocket knife..... E. A. Severance
Polishing lathe..... H. M. Crowell
Power mechanism. Interchangeable hand and motive..... C. E. Ellicott et al
Press..... M. Salzmann
Printing plates. Preparing..... E. Wunsch
Printing press..... H. T. Kent
Printing press automatic controlling mechanism..... T. C. Dexter
Printing press inking mechanism..... G. P. Feuner
Printing presses, &c. Automatic controlling mechanism for..... T. C. Dexter
Propeller for vessels. Hydraulic..... J. Dudley
Pulverizer..... J. G. McAuley
Pump..... H. C. Stouffer
Pump..... J. Willmann
Pump and water power motor..... G. Kadlecik
Pump rod counterbalance..... R. R. Smith et al
Punching machine..... E. A. Burke
Putter..... W. W. Davis
Puzzle..... G. T. Arnold
Rail joint..... E. J. Schindehutte
Railway..... T. M. Galbreath
Railway brake mechanism. Inclined..... S. E. Jackman
Railway. Electric..... L. W. Pullen
Railway. Inclined..... 2 pats..... S. E. Jackman
Railway. Rack..... R. Abt
Railway rail..... R. B. Gurnan
Railway rail joint..... B. G. Riggs
Railway switch. Electric..... J. G. Weniger
Railway switch. Electrically operated..... C. W. Breedlove et al
Railway tie..... H. Brunson
Raising and dropping mechanism..... S. C. Smith
Razor stropping and honing machine..... H. Wilcox

Range.....K. G. Kronvall
 Relay. Alternating current....G. W. Pickard
 Reversing mechanism.....2 pats.....F. J. Ball
 Rice hulling machine.....R. W. Welch
 Rifle. Repeating.....R. C. Stevenson
 Rivet.....C. D. Harrington
 Road making machine.....E. L. Lathrop
 Roadways. Construction of switchback.....H. Dutrieu
 Rock drills. Electric sparking ignition apparatus for gas.....J. V. Rice, Jr.
 Rotary explosive engine.....B. Banta et al
 Rotary steam engine.....W. J. Richmond
 Running gear.....L. T. Gibbs
 Sad iron.....K. Bennett
 Sad iron.....K. J. Schmidt
 Sad iron holder.....J. H. Cox
 Saddle seat. Harness.....H. Leibe
 Saddles. Antifriction seat cover for riding.....T. V. Brooke
 Safe.....W. S. S. Fleming
 Safe. Heat.....E. Kunz
 Sand blast apparatus.....W. R. King
 Sash fastener.....A. Assorati
 Sash lock. Window.....2 pats.....T. J. Sutton
 Saw set.....J. Dietrich
 Scale case and blank therefor. Single piece sheet metal.....W. N. Pelouze
 Scale. Weighing.....W. N. Pelouze
 School seat and desk. Combined.....J. H. Sutherland
 Screen.....W. E. Porter
 Scrubber.....J. Jester
 Scrubber, mop, and wringer. Combined.....L. Wagener
 Seal. Car.....A. W. Morgan
 Sealing and delivering mechanism. Envelop.....H. Harte
 Sealing machine. Envelop.....H. Harte et al
 Sealing machine. Package.....2 pats.....R. F. W. Beardsley
 Separator.....O. S. Emerson
 Sewing machine. Buttonhole.....W. E. Goodyear
 Sewing machine coupling.....J. M. Jackson
 Sewing machine fan attachment.....M. Steiner
 Sewing machine feeding mechanism. Carpet.....J. Wittemann
 Sheet metal strips. Rolls for use in the production of.....G. B. Johnson
 Sheet metal vessel.....J. R. McLaughlin
 Shelf. Differential wine.....J. T. Hicks
 Show window.....G. F. Jefferson
 Signaling apparatus. Electric.....F. B. Herzog
 Signaling apparatus. Wireless.....2 pats.....L. de Forest
 Signaling system. Wireless.....C. D. Ehret
 Signaling system. Wireless.....H. Shoemaker
 Siphon.....S. W. Miller
 Smoke consuming means.....R. Simms
 Snow plow. Reversible rotary.....O. Cutting
 Soldering machine.....G. L. Merrell
 Sound recording and reproducing machine sound box.....G. R. Cheney
 Spanner.....A. W. Smith
 Sparking mechanism. Variable.....G. E. Tregurtha
 Speed regulator. High.....L. Pagan
 Spinning and twisting machine.....C. T. & A. T. Atherton
 Spinning machine ring rail motion.....M. T. Bentley
 Spinning ring.....D. Harrington
 Spring mechanism. Friction G. Westinghouse Springs. End seat for elliptical.....C. A. Miller
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 Stamp. Time hand.....W. F. Bartholomew
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 Stoves or ranges. Adjustable water tank for structure. Composite.....G. A. Weber
 Sugar loaves. Drying.....E. Passburg
 Sulfur burning apparatus.....J. A. Marsden
 Surgical instrument.....T. A. Houghton
 Surgical pan.....W. A. Galloway
 Suspender end.....W. Bloomberg
 Switch.....T. Cope
 Switch and signal system. Electric interlocking.....G. Bleyne et al
 Switch mechanism.....J. W. Osborne
 Switch safety device. Point.....L. Dunn
 Synchronizer.....L. Andrews
 Telegraph or other blank.....S. Townsend
 Telegraph range finder. Wireless L. de Forest
 Telegraph receiver. Wireless.....L. de Forest
 Telegraphy. Generating set for wireless.....L. de Forest
 Telegraphy. Wireless.....L. de Forest
 Telephone apparatus locking device.....S. J. Larned et al
 Telephone exchange.....F. A. Lundquist et al
 Telephone system.....H. Redmon et al
 Telephone system.....A. D. T. Libby
 Telephone transmitter.....P. G. Randall
 Telephonic repeater.....M. Gally
 Threshing machine.....G. F. Conner
 Threshing machine feeder governor.....W. C. Peterson
 Tile machine.....D. E. Forton
 Tile. Roofing.....W. P. Grath
 Tobacco pipe.....J. W. Hayes
 Tobacco pipe.....W. C. Cunningham
 Tongs or grapple.....H. Sawyer
 Top prop.....H. Higgin
 Toy. Sounding.....R. H. A. Geistert
 Trap.....G. W. Hazel
 Treadle mechanism for light machinery.....J. Wiebe
 Trolley.....W. D. Williams
 Trolley harp device.....F. H. Allen
 Trolley stand.....W. H. Kilbourn
 Trousers.....S. A. Bieberstein
 Trunk guard.....J. Billy et al
 Truss.....J. Harris
 Turbine engine.....P. F. Holmgren
 Turbines. Apparatus for governing elastic fluid.....C. G. Curtis
 Turbines. Regulating.....J. Wilkinson
 Type writer attachment.....H. Marshall
 Type writing machine.....L. P. Diss et al
 Umbrella. Collapsible.....C. L. Marks
 Umbrella rib retainer.....S. E. Groff
 Urinal.....F. W. Henderson

Upholstery spring and means for supporting same.....G. E. Bigelow
 Valve.....F. L. Smith
 Valve. Disk.....R. Baumann
 Valve for compressing engines. Inlet.....I. H. Reynolds
 Valve mechanism.....W. A. Bollinger
 Valve motion.....C. F. Sleigh
 Valve. Regulating.....N. E. Nash
 Valve. Water supply.....H. Gardenier
 Valves, faucets, plumbers, fittings, &c. Handle for.....H. F. Keil
 Vapor generator and burner.....Q. Crane et al
 Vehicle body.....F. H. Bolte
 Vehicle. Motor.....T. W. Barber
 Vehicle. Motor.....W. W. & W. W. Burson
 Vending apparatus.....C. A. Dawes
 Vending machine.....W. S. Connor
 Vending machine.....H. V. Hoag, Jr.
 Vessels. Means for determining the nautical bearing of navigable.....H. W. Ladd
 Vise.....E. Shupe
 Vote counting machine.....J. McTammany
 Wad sorter and assembler.....B. W. Stevens
 Wagon. Speed.....J. P. Faber
 Waist lengthener.....N. C. Edwards
 Wall construction. Hollow.....D. E. Beeghly
 Wall wash.....W. W. Russell
 Washtub.....J. B. McLaughlin
 Washtub joint.....M. J. Kremer
 Water motor.....J. D. Lee
 Water tank.....J. T. Donahoo
 Weighing and packaging machine T. J. Brough
 Weighing apparatus.....G. Hoepner
 Wheelbarrow wheels. Mold for manufacturing.....T. D. Harris
 Winch. Combined hand and motive power.....C. E. Ellicott et al
 Windlass. Ship's.....J. Hansen
 Window.....O. Frotscher
 Window frame and sash. Metal J. A. Knisely
 Window attachment.....J. W. Anderson
 Wire stretcher.....W. B. Shotwell
 Wood holder.....J. E. Wallin
 Wrench.....W. E. Carter
 Wrench.....J. Speyer
 Wrench.....W. H. Ermentrout
 Wrench.....G. W. Rouse
 Wrench.....N. G. Forslund
 Yoke strap. Neck.....W. G. Callender

DESIGNS.

Badge.....J. T. Bailey
 Carpet.....2 pats.....F. A. Haas
 Carpet.....L. H. Brown
 Carpet.....W. A. Ferry
 Drinking counter, or bar proper, for bar fixtures.....J. Ehrenpreis
 Stove door.....D. F. Printz

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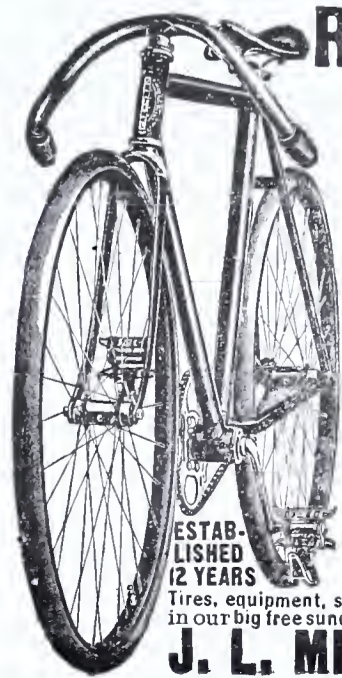
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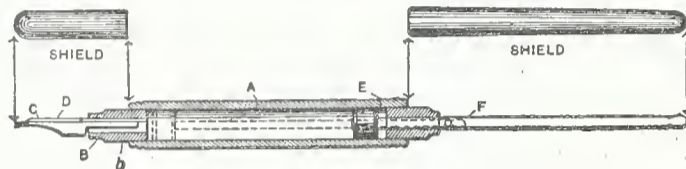


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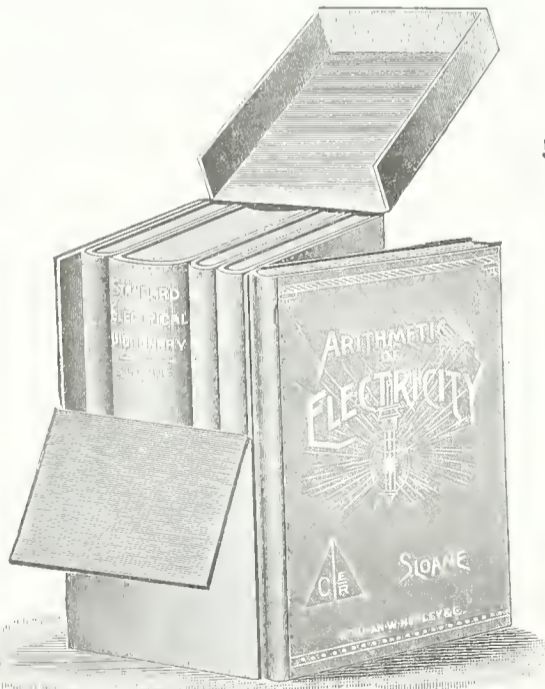
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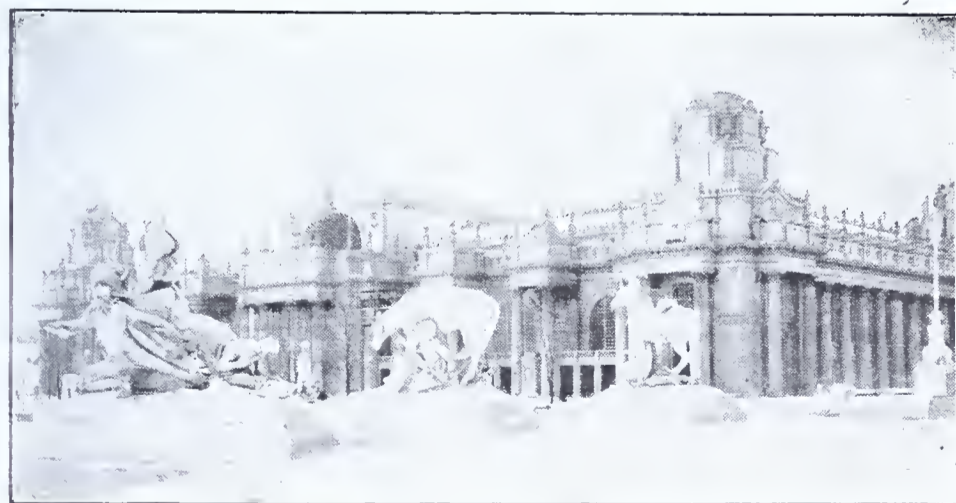
THE LOUISIANA PURCHASE EXPOSITION.



LIBERAL ARTS BUILDING.

The Liberal Arts Building is built of staff. Its contract price was \$475,000, and its builder the Kellermann Contraction Company. Although following the prevailing style of architecture of the Exposition—the Renaissance—it adheres very closely to classic lines. The long facade, especially, shows a magnificent entrance, almost pure Corinthian.

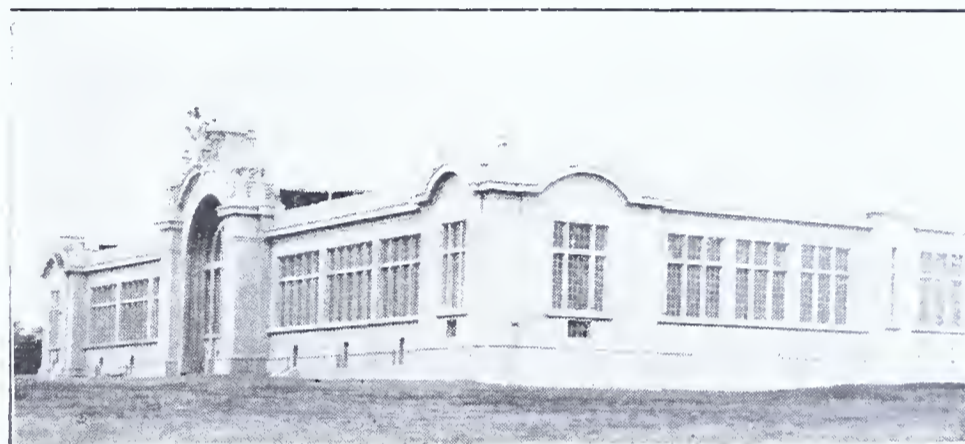
The style of architecture is a severe treatment of the French Renaissance for the exterior facades. In fact, the treatment embodies rather a feeling of the classic than of the Renaissance. It has been the endeavor of the architects to depend largely on sculpture in the decoration of the building, refraining from the over-use of stereotyped architectural ornamentation.



ELECTRICITY BUILDING.

The Electricity Building was erected by the William Goldie Sons Company, the contract price being \$399,940. The structure was planned by Walker & Kimball, of Boston and Omaha, who were chief architects of the Omaha Exposition. It is located on the main central avenue and forms one of the leading elements of the main Exposition picture. It has a frontage of 650 ft. toward the north and 525 ft. toward the east, facing the main lagoon.

The design is a bold columnated treatment of the Corinthian order. The columns are carried well down toward the ground, to give height to the facades. The latter are well accentuated by elevated pediments and tower effects over the four main entrances and at the corners. Over the accentuated places, as well as over the twin columns, which form a pleasing variation of the treatment of the facades, opportunity for ample sculptural decoration is supplied.



AGRICULTURE BUILDING.

The Agriculture Building stands on a hill just west of Skinker road and about one-half a mile south of the Administration Building. Its dimensions are 500 by 1600 feet. The long facade is broken up into bays accentuated by piers, the latter 100 feet from center to center. The ornamentation is concentrated in the main entrances, of which there are five: one in the center of each of the shorter fronts; one in the center of the front on Skinker road and two in the western front. The openings in these entrances are 52 ft. wide and 74 ft. high.

The building is probably the best lighted structure of the Fair. The roof is carried on nine bays of trusses, those in the center having a span of 106 feet. The building has little ornamentation, and although the largest structure on the ground, it cost little more than some of the buildings in the main architectural picture of the Fair. The contract price was \$529,940. The contractors are Caldwell & Drake, who also had the contract for the erection of the Horticulture Building.



ADMINISTRATION BUILDING.

The Administration Building at the World's Fair, St. Louis, is the principal structure of eleven new buildings known as the Washington University group, which is to be the permanent home of the university after the close of the Exposition. All are in Tudor Gothic style of architecture as exemplified in the college buildings of England of the time of Henry VIII and Queen Elizabeth. The Administration Building is 325 by 118 feet, and has in the center a massive tower 77 feet high, topped by four octagon towers, one at each corner. The doorway in the tower is a magnificent arch. The facade of the tower is elaborately ornamented with canopied niches, and with strong courses on which appear the heraldic shield bearing the university coat of arms. In front of the entrance is a terrace 50 by 264 feet, and leading up to the terrace are steps of cut granite 35 feet wide. The building is of pink Missouri granite with Bedford (Indiana) limestone trimmings, cost \$250,000, and is fireproof throughout.

A NEW PATENT TRIBUNAL.

The Court of Patent Appeals.

The American Bar Association, at its meeting held at Hot Springs, Va. in August, 1903, adopted the report of its Committee on Patent, Trademark, and Copyright Law concerning the formation of a court to be known as a "Court of Patent Appeals," and a bill carrying the recommendation into effect has been introduced in the Senate by Senator Platt, of Connecticut. It is a matter of great importance to owners of patent property that the bill should pass.

The present system fails to meet the plain requirements of justice. As is well known, we have nine judicial circuits, and a court of appeals for each circuit, so that in effect, we have nine supreme courts for the trial of patent causes. They are not bound to follow one another's decisions in respect to the same patent on the same state of facts. A patentee having established the validity of his patent in one circuit, has no assurance that it will be respected in any other. A manufacturer who has defeated a patent in a suit against his customer in one circuit, may be compelled to defend another customer in another circuit against suit on the same patent, and fight the whole ground over again. Indeed, a patent upheld by one circuit court of appeals may be nullified by another. It is true that the Supreme Court can step in and settle the conflict between circuit court of appeal by a writ of certiorari, but a patent is too short-lived to survive such proceedings.

Another serious defect is that each of the nine circuit courts of appeal must necessarily apply the recognized rules of law and of interpretation in the various patent cases which come before it, from the point of view of its own special attitude on the subject of invention and infringement and of liberal or strict construction. A patent submitted to the court in one circuit will be sustained, and the defendant held to infringe, because the court of appeals in that circuit is inclined to resolve the doubt in any case in which the invention has been of substantial utility in favor of the patent; while the same patent, if subjected to the ordeal of litigation in another circuit, would be held invalid or of narrow scope because the court in that circuit is inclined to deal strictly or harshly with patent property.

To remedy these and other defects, there should be but one court of appeals in patent matters, because each patent covers the whole United States, and a suit on it is, in reality, one between the patentee and all the people of the United States, the issue being the right of the patentee to exclude the public for a time from the use, without his consent, of the thing patented or alleged to be patented. When brought into litigation, the patent should be dealt with, once and for all, by an appellate court whose conclusions would be binding upon the courts and people of the whole United States. Moreover, all patents should be dealt with not only in accordance with the same rules of law, but with the same spirit and from the same point of view, and this is possible only when, as to all patent questions, there is a single court of last resort.

It is easily seen, though, that there is some difficulty in the way of creating such tribunal by the usual mode of selecting judges for the United States courts, who are appointed for life. Patent law is a narrow and somewhat technical field of jurisprudence. The tendency of permanent service on the bench in a court engaged exclusively,

or mainly, in the trial of causes in that one field, might be to make the judge narrow and technical himself. Once there, he could not be ousted for that cause. The creation of such a court to be made up in that way, would be an experiment in which an unfortunate step would be hard to retrace. To minimize such a danger, there is provided in the bill that only the president judge shall be appointed by the President for life, while the associate judges shall be designated from among the circuit judges by the Chief Justice of the United States Supreme Court to sit for periods of six years each, two to retire every two years, and be replaced by two others coming directly from the circuit bench.

This method of selection would insure the presence on the bench of judges of known and tried ability and experience in the field of general jurisprudence, as well as in the patent law. It would also give to the Chief Justice the opportunity to keep the bench of the United States Court of Patent Appeals filled with men who had demonstrated their fitness for the particular work of the court.

After a period of service in the United States Court of Patent Appeals, the associate judges would return to their duties on the circuit bench with added knowledge and experience in the field of patent law, and undiminished capacity for usefulness in the general field. More than that, their experience in the field of patent law in the United States Court of Patent Appeals, would give added value and weight to their decisions in patent causes on the circuit bench, and tend to increase the confidence of the public in those decisions and diminish appeals from them.

At first blush, it would seem that the proposed court is to be created in the interests of patentees, but this is not so. It is well known that the courts declare more than half the patents which come before them to be invalid, and it is as much to the interests of the public generally that these void patents should be killed by judgments that reach the whole country at once, as it is to the interests of owners of valid patents that they shall be sustained by decrees of like effect.

The proposed plan will involve a minimum change in the present system for the attainment of an equally beneficial change in its working. Only one new judge will be required—the president judge of the new court. There will be the same work to do as now, and the same men to do it. Some increase in the number of circuit judges will be required, but that increase need not be to the full number of judges in the new court, because the removal of patent appeals from the jurisdiction of the circuit courts of appeal will greatly lessen the work of that court.

One provision of the bill which will be particularly pleasing to practitioners before the United States Patent Office, is the fact that the jurisdiction now existing in the court of appeals of the District of Columbia, on appeal from the decision of the Commissioner of Patents in *ex parte* and interference cases, is conferred upon the new court. It has always seemed absurd to appeal from the decisions of the specially trained experts of the Patent Office to any court on a mere question of the issue of a patent or title to an invention by priority, as in interference, but such objections could hardly apply to an appellate court whose sole business is to try questions relating to patents. The court of appeals of the District of Columbia would, it is believed, welcome an Act relieving it of this perplexing and unpleasant duty, as in common with many courts of the United States, it dislikes to try patent causes on account of the difficulty of the points involved, and the fact that they often depend on controverted questions of physics to be decided upon conflicting evidence.

The details of the bill follows:

A BILL

To establish a United States Court of Patent Appeals, and to define and regulate the jurisdiction thereof, and to define and regulate, in certain cases, the jurisdiction of other courts of the United States, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby created a United States Court of Patent Appeals, which shall consist of seven judges, of whom four shall constitute a quorum, and which shall be a court of record with original and appellate jurisdiction as is hereinafter limited and established. Such court shall prescribe the form and style of its seal and the forms of its writs and other process and procedure as may be conformable to the exercise of its jurisdiction as shall be conferred by law. It shall have the appointment of the marshal of the court, who shall have the same powers and perform the same duties under the regulations of the court as are now provided for the marshal of the Supreme Court of the United States, so far as the same may be applicable. The court shall also appoint a clerk, who shall have the same powers and perform the same duties now possessed and performed by the clerk of the Supreme Court of the United States, so far as the same may be applicable. The salary of the marshal of the court shall be three thousand five hundred dollars a year, and the salary of the clerk shall be five thousand dollars a year, both to be paid monthly in twelve equal payments. The cost and fees now provided by law in the Supreme Court of the United States shall be the costs and fees in the United States Court of Patent Appeals; and the same shall be collected, expended, accounted for, and paid over to the Treasury Department of the United States in the same manner as is provided by law in respect to the costs and fees in the Supreme Court of the United States. The court shall have power to establish all needful rules and regulations for the conduct of its business.

SEC. 2. That the President of the United States, by and with the advice and consent of the Senate, shall appoint a president judge of said United States Court of Patent Appeals; and as vacancies occur shall in like manner appoint others to fill such vacancies from time to time. The acceptance of that office by a judge of the circuit court or district court of the United States shall vacate his office as circuit or district judge.

SEC. 3. That upon the taking effect of this Act the Chief Justice of the United States shall designate in writing two judges of two of the circuit courts of the United States (one from each) to sit as associate judges of the United States Court of Patent Appeals for two years from the first day of the first term thereof, and two other judges of two other circuit courts of the United States (one from each) to sit as associate judges of the same court for four years from the first day of the first term thereof; and two other judges of two other circuit courts of the United States (one from each) to sit as associate judges of the same court for six years from the first day of the first term thereof. And after that, as the periods expire for which such designations shall have been made, the Chief Justice of the United States shall fill the vacancies thus occurring by designation of other judges of circuit courts of the United States to sit for periods of six years each. In case of the death or disability of any associate judge of the said court the Chief Justice shall designate another judge of a circuit court of the United States to sit for the unexpired period for which his predecessor had been designated. No judge shall be designated to sit as associate judge in the United States Court of Patent Ap-

peals for more than one period of six years continuously; but any associate judge of said court whose period of service shall expire after not more than three years of service continuously may be designated to sit for a further period of six years. The designation of a judge of the circuit court of the United States to sit as associate judge of the United States Court of Patent Appeals and his service in that court shall not vacate his office as judge of the circuit court.

SEC. 4. That a term of the United States Court of Patent Appeals shall be held annually at the city of Washington, beginning on the second Monday of October in each year, and the same may be adjourned from time to time as the court shall order. If at any time for the meeting of the court a quorum of the judges shall not be present, the judges present may adjourn the court, and, if necessary, adjourn again from time to time until a quorum appear. If at any sitting of the court the president judge shall be absent, the associate judge senior in commission as judge of the circuit court of the United States, or senior in age, in case of commissions of even date, shall preside. Until it shall be otherwise provided by Congress, the sessions of the court shall be held in a building or rooms to be provided by the marshal of the District of Columbia, under the direction and approval of the Attorney-General of the United States. The court shall by order authorize its marshal to employ such deputies and assistants for himself and the clerk of the court, and such criers, bailiffs, and messengers as the business of the court shall require, and to pay the salaries of such employees at rates of compensation not exceeding those paid for similar services in the Supreme Court of the United States, and to pay all other necessary incidental expenses of the court. The president judge and each of the associate judges shall be entitled to employ a clerk, whose salary, at a rate not exceeding that allowed the clerks of the Chief Justice and associate justices of the Supreme Court, shall be paid as part of the expenses of the court.

SEC. 5. That the president judge of the United States Court of Patent Appeals shall receive a salary of twelve thousand dollars per year, and the associate judges of said court shall each receive a salary of eleven thousand five hundred dollars per year, all payable in twelve equal monthly installments.

SEC. 6. That the United States Court of Patent Appeals shall have jurisdiction to hear and determine appeals and writs of error from final judgments and decrees in the circuit courts of the United States in cases arising under the laws of the United States relating to patents for inventions and to copyrights, and from the supreme court of the District of Columbia and from the Commissioner of Patents in cases arising under the laws of the United States relating to patents for inventions, applications for patents for inventions, including interference cases, and to copyrights. All such appeals shall be taken within six months after the entry of the order, judgment, or decree sought to be reviewed. The practice, procedure, and forms to be observed in the taking, hearing, and determination of such appeals and writs of error shall conform to the practice, procedure, and forms observed in like cases in the Supreme Court of the United States, subject to such rules and regulations as shall be prescribed by the court for itself.

SEC. 7. That whenever, by an interlocutory order or decree in a circuit court of the United States in a case in which an appeal may be taken from the final decree of such court to the United States Court of Patent Appeals, an injunction or restraining order shall be granted, or refused, or continued, or vacated, or modified, or retained without modification after

motion to modify the same. an appeal may be taken from such order or decree by the party aggrieved to the United States Court of Patent Appeals: *Provided*, That the appeal must be taken within thirty days from the entry of such order or decree: and it shall take precedence in the appellate court; and the proceedings in other respects in the court below shall not be stayed unless otherwise ordered by that court, or the United States Court of Patent Appeals, or a judge thereof, during the pendency of such appeal.

SEC. 8. That the United States Court of Patent Appeals shall have exclusive original jurisdiction to hear and determine all suits brought by the United States to annul or change letters patent granted for inventions or to annul or set aside copyrights. All such suits shall be by bill in equity in the name of the United States of America upon the relation of the Attorney-General; and from the final decree of the United States Court of Patent Appeals in every such suit, an appeal may be taken within one year to the Supreme Court of the United States. The practice, forms, and procedure in the taking, hearing, and determination of such appeals shall conform to the practice, forms, and procedure in the case of appeals from the circuit courts of the United States to the Supreme Court of the United States: *Provided*, That nothing in this section contained shall be construed to authorize the bringing of any suit by the United States not authorized by law to annul or change any patent granted for an invention, or annul or set aside any trade-mark or copyright.

SEC. 9. That the president judge and the associate judges of the United States Court of Patent Appeals shall each exercise the same powers in term and in vacation in the allowance of appeals, supersedeas orders, and other matters incidental to the jurisdiction and business of the court as are now exercised by the Chief Justice and associate justices of the Supreme Court of the United States in relation to the business and jurisdiction of that court.

SEC. 10. That the decisions of the United States Court of Patent Appeals in all cases within its appellate jurisdiction shall be final except that it shall be competent for the Supreme Court of the United States to require, by certiorari or otherwise, any such case to be certified to it for its review and determination with the same power and authority in the case as though it had been carried by appeal or writ of error from the trial court directly to the Supreme Court.

SEC. 11. That, whenever any case shall have been certified from the United States Court of Patent Appeals to the Supreme Court of the United States, by certiorari or otherwise, it shall be, upon its determination by the Supreme Court, remanded to the circuit court of the United States or other court in which it originated for further proceedings to be taken in pursuance of such determination. In every case determined by the Supreme Court of the United States upon appeal from a judgment or decree of the United States Court of Patent Appeals, rendered in the exercise of its original jurisdiction, the case shall be remanded to the United States Court of Patent Appeals for further proceedings to be taken in pursuance of such determination. And in every case determined by the United States Court of Patent Appeals upon appeal or writ of error, the case shall be remanded to the circuit court of the United States or other court or tribunal from whence it came, for further proceedings to be taken in pursuance of such determination.

SEC. 12. That all appeals and writs of error in cases in which appellate jurisdiction is by this Act conferred upon the United States Court of Patent Appeals which shall have been pending without hearing in the United States circuit courts of appeals for six calendar months prior to the taking

effect of this Act shall be transferred from such circuit courts of appeals to the United States Court of Patent Appeals and be heard and determined in that court as though they had been taken there from the trial court by appeal or writ of error; all other appeals and writs of error in cases in which appellate jurisdiction is by this Act conferred upon the United States Court of Patent Appeals which shall be pending in the United States circuit courts of appeals at the time of the taking effect of this Act, shall remain and be heard and determined by the United States circuit courts of appeals in which they may be pending, respectively, as though this act had not been passed.

SEC. 13. That, after the taking effect of this Act, no appeal or writ of error shall be taken from any circuit court of the United States to any United States circuit court of appeals in any case in which an appeal or writ of error may be taken to the United States Court of Patent Appeals under the provisions of this Act.

SEC. 14. That all laws and parts of laws inconsistent with the provisions of this Act are hereby repealed.

SEC. 15. That this Act shall take effect and be in force on the—day of—, nineteen hundred and—.

A NEW GRAIN DRIER.

AN INVENTION OF GREAT MERIT.

The present may truly be termed the great inventive age, for during the last decade some wonderful strides have been made toward perfecting machinery for all lines of work, and in no line has the improvement been more marked, nor the advancement greater, than in machinery for handling grain.

Until very recent years, there were few machines designed for drying and treating damaged grain, and many thousands of bushels of grain damaged from various causes, *i. e.*, prolonged rains at harvest time, leakage of boats, wrecks, fires, etc., have been of very little value, if not a dead loss entirely, but progress in that line of business has been steadily advancing and improving, till now it is possible, by the use of drying machines, to restore such grain to almost its original value.

The salvaging of damaged grain has grown to such an extent, that some firms devote almost their whole energy to it, notably the Toledo Salvage Company, of Toledo, Ohio, who have a very extensive plant, capable of treating 24000 or 25000 bushels of grain a day. Whenever an elevator is burned, or a boat wrecked, representatives of this concern may be found, negotiating for the damaged grain, even going as far as Kansas City for it, from which place they dried thousands of bushels damaged by the floods last spring, and which had to be hauled to Toledo for treatment, where it was put into marketable shape or condition. Ten years ago, it would have been about impossible to do this, and such grain would have been an entire loss.

As an evidence of the perfection that is being attained in machinery for this kind of work, we herewith produce a half view of a machine in operation, invented by Mr. J. W. Irwin, Superintendent of the Northern Elevator Company's transfer house at Emerson, Manitoba, and designed for drying damp or tough grain, and cooling warm grain. It possesses the virtue of being cheap in construction, eco-

nomical in operation, and exceedingly efficient in its work.

The machine is composed of a large annular shaped heater *A*, made of boiler plate and capable of standing a high pressure of steam. This heater is supported by four legs which hold it up several inches above the bottom of the drying sieves.

Inside this heater are placed two annular shaped sieves, *B* and *C*. The inner one is considerably smaller than the outer one, thereby forming the walls of a space, *D*, through which grain for treatment passes. Above these sieves, and attached to the inner one, is placed a fan, *E*, which in turn, is attached to the feed spouts, *F*. The whole is mounted on a frame, which is cased in on all sides as high as *G*.

Grain for drying is fed down through feed spouts *F* into the drying space *D*. When the fan, *E*, is put in motion, it

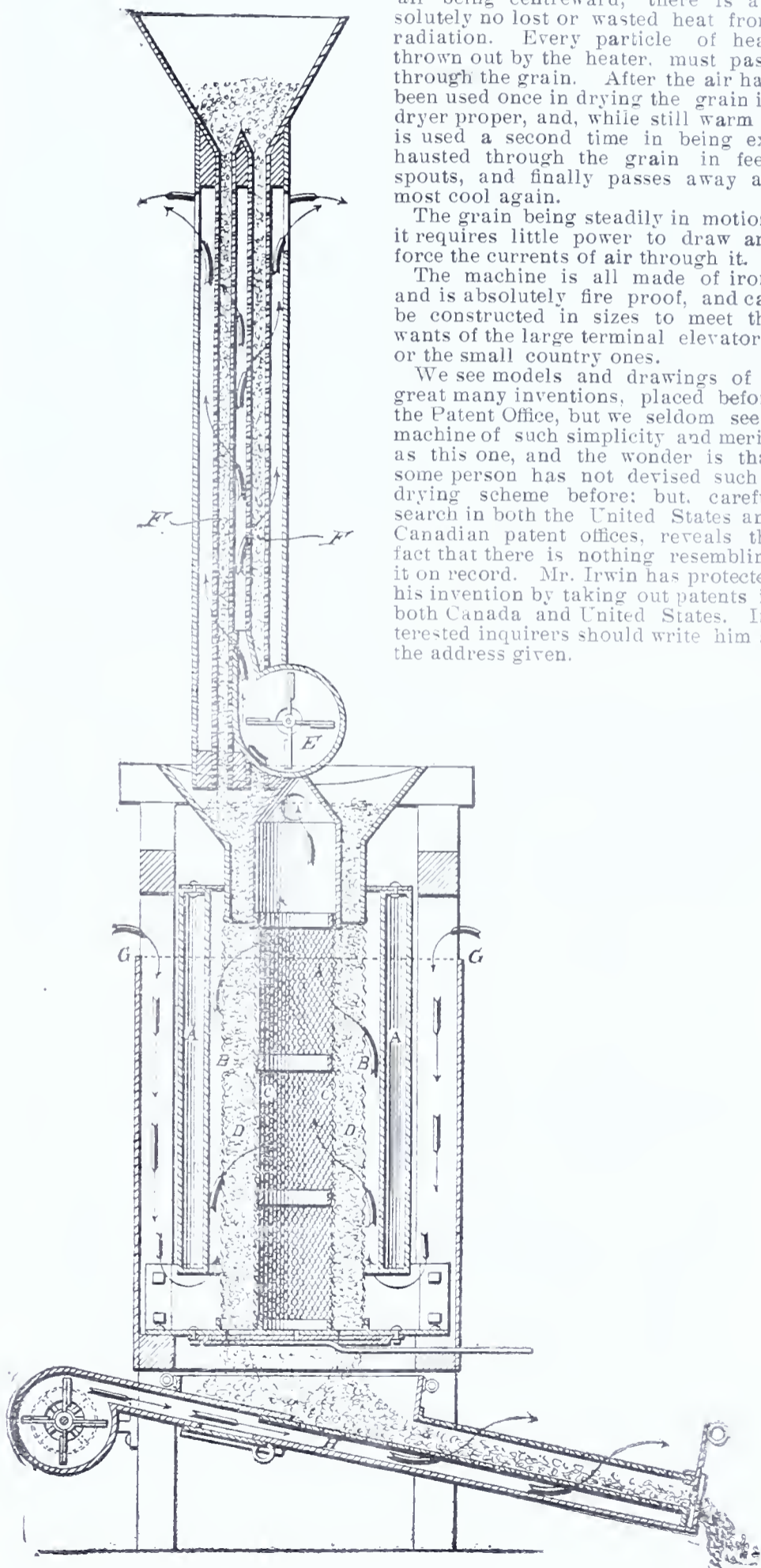
draws a current of air over the top of casing *G* down the sides of, and under heater and sieves, where it becomes hot, and is drawn through the grain confined between the sieves, after which it is exhausted away through the grain being fed to machine in feed spouts *F*. When the grain between the sieves is sufficiently dry, gates or sluices at the bottom are opened, permitting the grain to drop down into the cooling apparatus underneath. This is a broad, shallow spout, with perforated bottom and top, through which the grain passes, and through which cold air is forced from the air chamber, *H*. When sufficiently cool, the gate at end of cooling spout is opened sufficiently to allow a steady stream of grain to pass away to the storage bins.

Among the many points of advantage claimed for the machine are the following: The sieves, being placed inside the heater, and the currents of air being centredward, there is absolutely no lost or wasted heat from radiation. Every particle of heat thrown out by the heater, must pass through the grain. After the air has been used once in drying the grain in dryer proper, and, while still warm it is used a second time in being exhausted through the grain in feed spouts, and finally passes away almost cool again.

The grain being steadily in motion, it requires little power to draw and force the currents of air through it.

The machine is all made of iron, and is absolutely fire proof, and can be constructed in sizes to meet the wants of the large terminal elevators, or the small country ones.

We see models and drawings of a great many inventions, placed before the Patent Office, but we seldom see a machine of such simplicity and merit, as this one, and the wonder is that some person has not devised such a drying scheme before: but, careful search in both the United States and Canadian patent offices, reveals the fact that there is nothing resembling it on record. Mr. Irwin has protected his invention by taking out patents in both Canada and United States. Interested inquirers should write him at the address given.

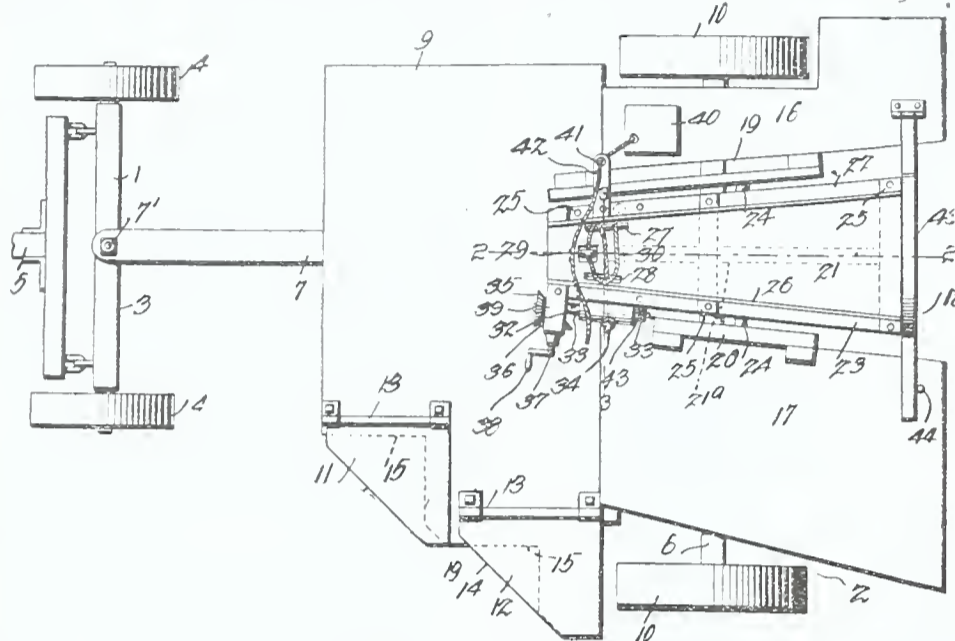


CLEVER NEW PATENTS.

CORN HARVESTOR.—CAR BRAKE.—CULTIVATOR.—HAY DERRICK.

Corn Harvester.

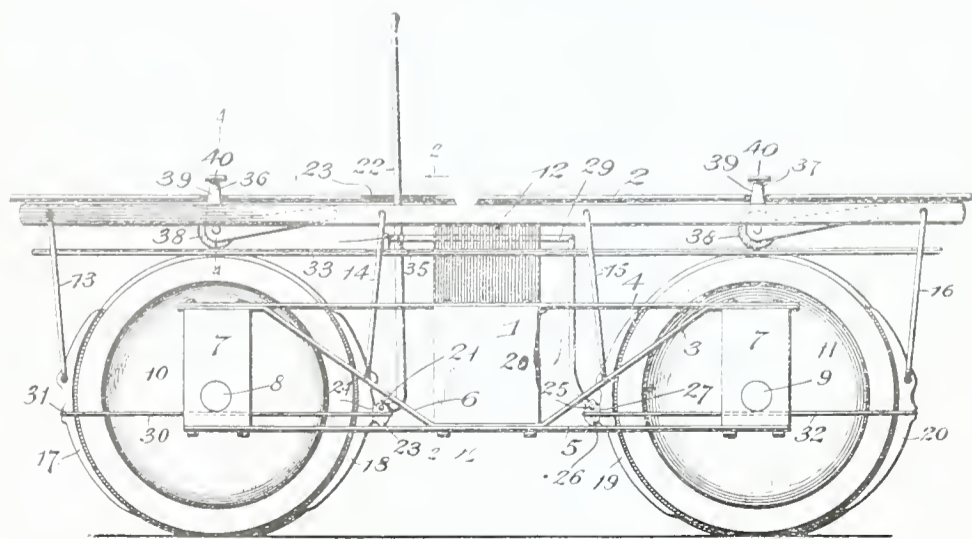
A very simple corn harvester has been patented by Mr. Charles E. Detling, a well known inventor residing in Ansonia, Ohio.—The accompanying illustration is a top plan view of the machine and affords a very good idea of the general structure thereof. Any desired form of running gear may be employed, supporting suitable platforms, shown at 9 and 17. On one end of the forward platform and in advance of one of the rear wheels, are secured cutting plates 11 and 12, adapted to simultaneously cut two rows of corn. The operators, standing on the platform 9, gather this corn as it is cut and place it in a binder mounted on the rear platform in a substantially horizontal position. The binder consists of a basket or shock carrier 21 across which



are arranged suitable compressing ropes or cables that are attached to a drum. The workmen stationed on the cutter and shock platforms place the stalks, as rapidly as they are cut, in the basket and when the same is filled, the compressing cables are crossed over the shock, after which the windlass or drum 32 is turned until the shock is tightly bound. It is thereupon tied by suitable binding twine. A gate 43 located at the rear of the basket is then opened, and the shock, being released, will pass from said basket and assume an upright position on the field in rear of the machine. The invention affords comparatively simple means whereby a plurality of rows of corn can be cut on one side of a machine, while the shocks can be rapidly and accurately formed and deposited closely together in rows across the field, thereby clearing the same and enabling it to be sowed in grain before the shocks are removed.

Car Brake.

Notwithstanding the thought, study and experiments of many experts in the field, it has remained for Mr. Andrew R. Moore, of Charlotte, Mich., to give to the world a most ingenious invention in car-brakes. It is adapted to be actuated either by foot or hand power, and secures the force of the rotating wheels to effect the efficient action of the brake. Between the front and rear wheels of the truck are mounted movable brake shoes arranged to engage such wheels. A pair of rock shafts 21 and 25 is journaled, one adjacent to each wheel, and are provided with cam members that operate against the rear sides of the brake shoes to move the same into engagement with their respective wheels. The operating levers have link connections with the shafts, so that

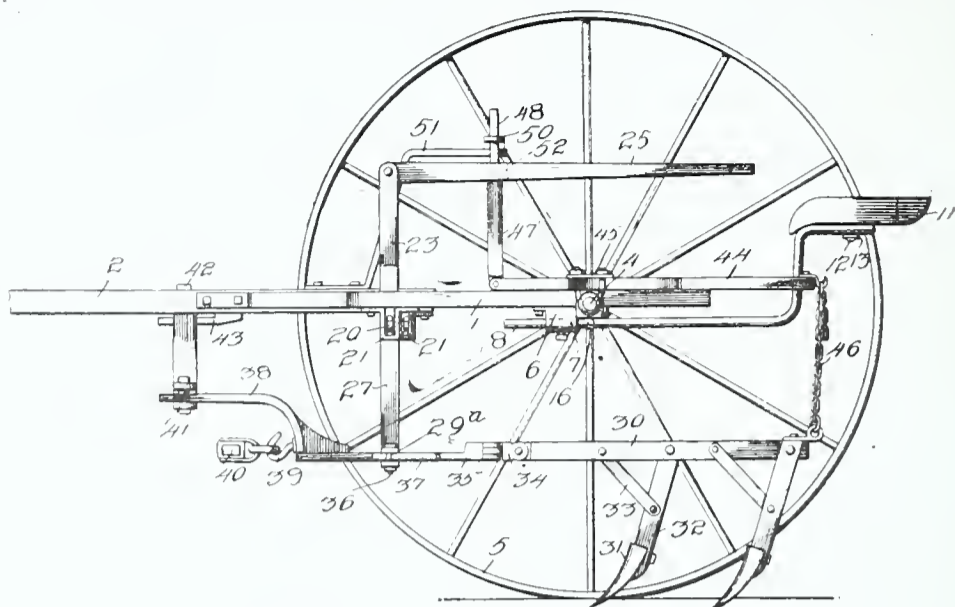


the same can be readily moved by hand. In connection therewith a friction plate 33 is longitudinally movable over and is adapted to rest upon the wheels. This plate is also connected with the rock shafts, and can be forced into engagement with the wheels by means of bell crank levers 37 having rollers 38 that rest upon the plate, the upper free ends of the levers constituting treadles 40. Therefore, if the brakes are to be applied, the handle lever 22 may be moved, or, by stepping upon either of the treadles 40, the friction plate will be brought into engagement with the periphery of the wheel beneath it, so that said plate will be moved longitudinally, thereby moving the rock shafts and effecting the engagement of the brakes.

A one-half interest in the patent has been assigned to William J. Byers, also of Charlotte, Mich.

Cultivator.

A cultivator that appears to be worthy of note has been invented by Mr. Emory Merrill, of Waverly, Nebraska, and a one-half interest in the patent obtained thereon has been assigned to Pearl Jewett of the same place. The invention relates to wheeled cultivators, a substantially horizontal frame being

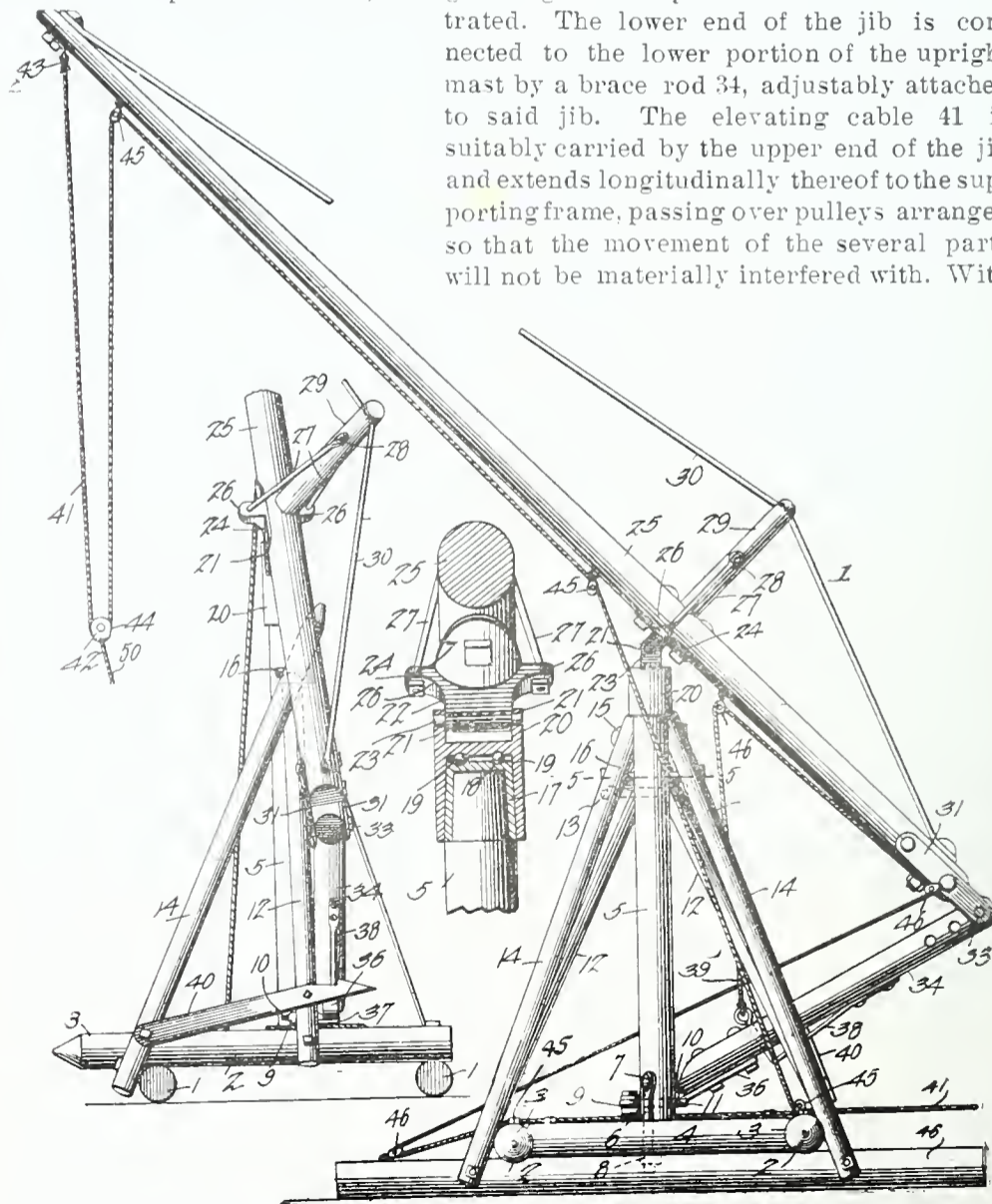


employed, which is mounted on ground wheels and has a forwardly projecting tongue. The cultivator frames proper are two in number, and are pivoted at their front ends to the horizontal frame so that they can swing laterally. Each frame, moreover, has an intermediate universal joint, in rear of which the blades are located. The frames are suspended at their rear ends by chains. Each frame is connected with an operating lever 25, that can swing laterally as well as vertically, the connections also permitting corresponding movements of the cultivators, so that the operator may from the seat 11 direct the same in any manner and in any direction desired.

Hay Derrick.

An important advance in hay stacking machinery has been made by Mr. Thomas De La Mare, of Tooele, Utah. Mr. De La Mare has devised a unique supporting frame consisting of sills upon which is mounted an upright standard 5, held in position by braces 14, connecting its upper end and the sills, these braces being secured in a peculiarly rigid manner. A ball-bearing swivel 20 is mounted upon the upper end of this standard, and the jib or derrick arm is pivoted thereto, being strengthened by a truss brace 30 as illustrated.

The lower end of the jib is connected to the lower portion of the upright mast by a brace rod 34, adjustably attached to said jib. The elevating cable 41 is suitably carried by the upper end of the jib and extends longitudinally thereof to the supporting frame, passing over pulleys arranged so that the movement of the several parts will not be materially interfered with. With



this structure, heavy loads can be handled with ease and celerity, and a stack of large size can be built as compared to the size of the machine itself. The derrick can be readily reversed so that its range of area is large, and it will be evident from the cut, that it is strong and durable.

THE MONORAIL RAILWAY.

Rapid transit is the problem for the dawn of the twentieth century to solve. It is the desire to avoid the delay caused by friction with the earth, that attracts attention to aerial navigation. Reports from Germany indicate that it will be possible, by means of electric traction, to maintain a speed of 90 miles an hour, although, so far, the expense is too great to make it commercially practicable. Throughout the country the railroad companies are laying heavier rails, eliminating curves, digging tunnels, and straining every nerve to save time. And if the

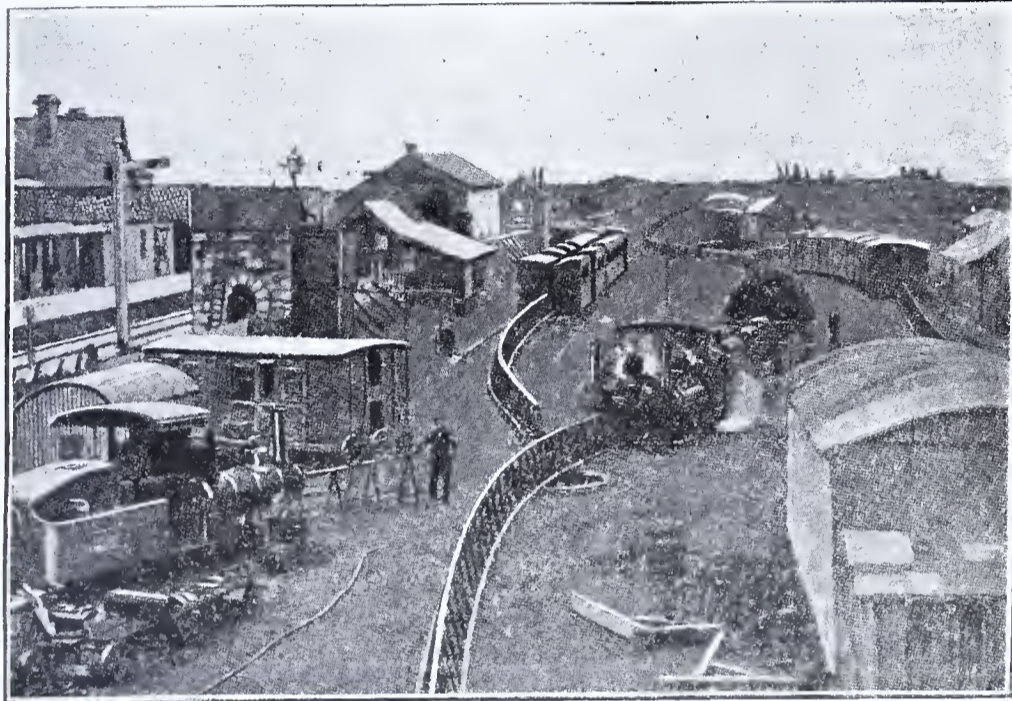
method, that several million dollars have been raised for the work of construction and operation. Mr. Behr's attention was first directed to monorails in 1882, when a French engineer built a monorail in Algeria, to carry agricultural produce across a sandy plain. The ordinary light railway was of no use, as it was swallowed up in the sand. It occurred to the French engineer that by raising the carrying rail from 2 to 3 feet above the surface of the soil, he would get a smooth surface free from sand on which to carry the produce. This was the simplest

their entire length, so as to make two long compartments, one on either side of the rail. The compartments of the cars and the boilers of the locomotives are the ordinary distance from the ground, so that, with the running gear well up in the interior, plenty of equilibrium is secured, in the same manner as a champagne cork with two pen-knives stuck into it at opposite sides is balanced upon the point of a needle.

The general adoption of the monorail system will mean a complete revolution of present railway methods, and will offer a means for the application of electricity to travel in a practical and cheap manner. Mr. Behr says that the attainment of high

These theories were tested on an experimental line in Brussels. It was three miles long, and the trestles were four feet high. The carrying rail weighed 84 pounds per yard, and the cars, 60 feet in length, could accommodate 100 passengers. The power used was electricity. The results were conclusive, although the scheme was tested in every possible manner. A regular speed of 90 miles an hour was maintained, in spite of sharp curves. The deflections of the rails were measured carefully, and in no instance was there any tendency on the part of a carriage to derail.

The Liverpool-Manchester road is intended for the transport of passengers, the manager's not consider-



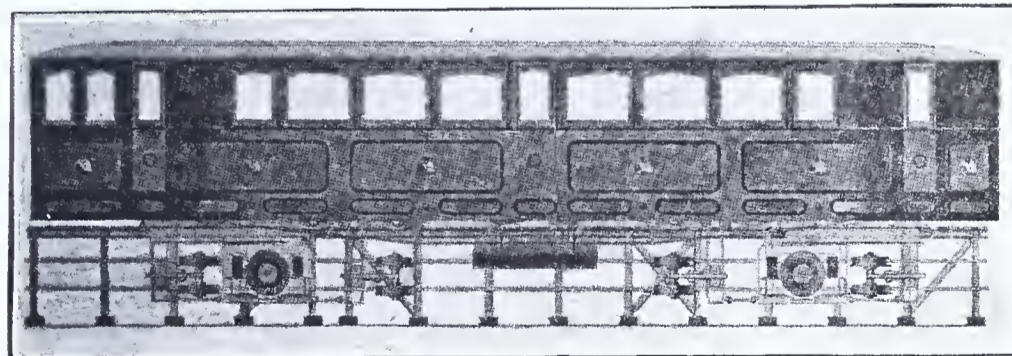
IN THE REPAIR SHOPS OF THE LISTOWEL BALLYBUNION LINE IN IRELAND.

claims made for the monorail railway are correct, we may be able soon to travel at the rate of two miles a minute.

Monorail systems are by no means new, yet less is known about them in the United States than in foreign countries. A trestle, shaped like the letter A, with an average height of 4 feet from the ground level, upholds the single rail on which the train travels. The cars and locomotives are simply

form of monorail, having but one carrying rail, and no guide wheels or guide rails. The trestles were wooden affairs, placed on the sand, with no sleepers. The hauling was effected by mules.

A railway of this system has been in operation in Ireland for some twelve years, and has worked with satisfactory results. It is a light railway, designed for a speed of from



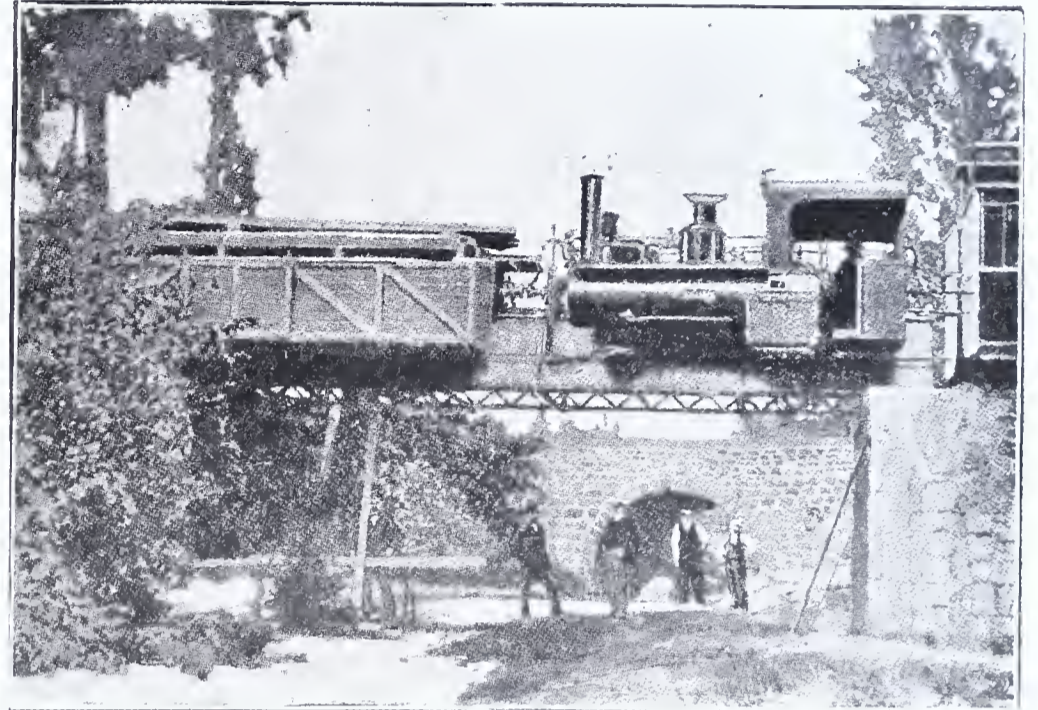
ELEVATION OF A CAR SHOWING THE HORIZONTAL GUIDE WHEELS.

placed astride this rail, and it is the duty of the guide rails, placed on either side of the trestle, to support them when the equilibrium is destroyed by too great a speed on curves, or by too heavy loading on one side.

Mr. F. B. Behr, a London engineer, proposes to construct a monorail system between Manchester and Liverpool—a distance of about 34 miles—where the daily traffic is very heavy. He has so far succeeded in convincing capitalists of the practicability of his

15 to 20 miles an hour. Many of the curves are sharp, and the grades are heavy. The cars look like ordinary railway cars that have been cut in two lengthwise, with the two outsides cemented together. This makes the roof of the car highest at the edges and sloping to a gutter in the middle. The locomotives are of the two boiler variety, and each boiler is distinctively on one side of the rail, just as a pair of horses stand each on one side of a carriage pole. The running gear is between.

The cars, inside, are partitioned



A STEAM-DRIVEN ENGINE ON THE MONORAIL SYSTEM IN FRANCE.

speed on a two-rail railway has been proven to be so expensive and so difficult commercially—the limit having, in fact, been already reached, at 50 miles an hour for long distances—that he tried to find another way of gaining the desired speed, and hit upon the monorail as an agent. The first requirements were, of course, absolute safety and security from derailment. The cars being constructed so as to have the centre of gravity below the top rail, it will be seen that, when the track is made sufficiently strong and the guide rails are properly placed, derailment is a practical impossibility.

ing the handling of freight. The separation of high speed from low speed traffic, by placing them on separate rails, would produce at once the possibility of punctuality on express trains, and would dispose of 90 per cent of the causes of accidents. If the monorail works as successfully as promised, it would seem that the millenium had been reached in the railway world: no more accidents, no spreading rails, no dust, no cinders, and, above all, a speed greater than man has yet been able to attain.

The illustrations are self explanatory and give a complete understanding of the system.

PATENTS

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MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been procured through the Patent Soliciting Office of E. G. Siggers, Patent Lawyer, Washington, D. C.

James D. Smith, Arlington, South Dakota. Two patents. Wheel Holding Machine and Tire Bolt Wrench. The wheel holding machine, which is designed particularly for blacksmiths, wheelrights and wagon builders, is adapted to support a wheel in substantially a horizontal position, and is capable of rigidly clamping the same to prevent wobbling and looseness when the wheel is operated on. The apparatus comprises a stand, upper and lower links, a lever pivotally connected to the adjacent ends of the links and arranged to swing the same past each other to form a lock, and a wheel clamp receiving the upper link and provided with a pivoted dog, having an engaging portion of greater length than the distance between the pivot and the link, whereby the clamp is adapted to engage the link at any point.

The tire bolt wrench is adapted to engage the head of a tire bolt to prevent the same from turning when the nut is being screwed on or off, and it yieldably engages the felloe so that the wrench head may effectively engage the nut, should the same be flush with or counter-sunk in the felloe. The wrench is composed of a body, a shaft, mounted on the body and rotated by gearing, and provided with a wrench head, a substantially U-shaped clip embracing the body and provided with opposite spring arms, lying at the opposite sides of the wrench head in position to bear against the felloe, and the bolt holder operated by a cam lever and arranged to engage the head of a tire bolt.

Absalom B. Wells, Washington, D. C. Hose Nozzle.—The present invention provides a simple and effective means for detachably connecting a hose section to a nozzle. It dispenses with the usual screw threaded connection or coupling. It consists essentially of a nozzle having a keeper and fitting within the hose, in combination with a band, clamping the hose and provided with a hinged bail, arranged to swing into and out of engagement with the keeper. The nozzle may be readily detached from the hose by forcing the pivoted bail out of engagement with the keeper.

Pennock M. Way, Tallapoosa, Ga. Saw.—This invention relates more particularly to buck saws, and a most ingenious and simple frame is covered by the patent. The said frame is constructed of wire, preferably a single piece, forming the intermediate bar and the side arms, one of which is extended to constitute a handle. Both the bar and side arms are formed of double lengths of wire, and clips connect the same at different points for the purpose of strengthening them. These clips also comprise hand grips and devices by which the saw and tension bars are connected to the frame. The structure is such that it may be readily manufactured, and certainly can be placed upon the market at small expense.

Rev. Albert S. J. Haygood, Hempstead, Texas. Window.—One of the principal features of the invention resides in means for connecting the sashes of the window, so that each will form a balance for the other, the means being so constructed that the independent adjustment of each sash is permitted, in which latter relation the connecting means serves as a lock for one of the sashes. The usual sliding sashes are employed, and pulleys

are mounted upon the window frame between them. Cords connect the sashes and pass over the pulleys, these cords being detachable from one of the sashes. A sliding bolt is mounted on the window frame and is movable into and out of sockets formed in the other sash.

Joseph Wright, Lancaster, Wis. Girth.—It is a well known fact that many horses while being saddled have a habit of maintaining their bodies in an expanded or distended position during the tightening of the girths, so that after this operation is completed and they assume their normal conditions, said girths are extremely loose, thereby permitting the slipping of the saddles. Mr. Wright's invention overcomes this objection by interposing in the girth a spring device of novel construction which will take up any slack of the parts, and also permit the natural movement of the horse without interference; a device which, it will be apparent, is something that fills a long felt want.

Frank J. Sibley, Findlay, Ohio. Railroad Tie.—The tie is formed preferably of metal comprising a base having upstanding spaced flanges, the base being reinforced below the lines of crossing of the rails and the flanges having under-cut seats for such rails. These said rails are secured in place by fastening devices which straddle certain of the flanges and fit in the seats having overhanging hook portions that engage the rails. It appears to be only a question of time before metal ties must of necessity take the place of those constructed of wood, and hence the activity displayed in this line, and the great field for such a structure.

Mrs. Louise Wagener, 645 Sixth Avenue, New York City, N. Y. Two patents. Window Seat; Combination Scrubber Mop, and Wringer. This invention has for its object to provide a support or platform adapted to be readily fastened in a window for convenience in cleaning, painting or repairing the exterior of the window. It is composed of a platform provided at its rear edge with an upstanding rigid back, and it has rigid upstanding sides. A foldable back section is connected with the upper edge of the rigid back by hinges, and foldable side sections are hinged to the ends of the foldable back. The foldable members are locked in an upright position by suitable catches and keepers. Opposite window frame engaging braces are connected with the foldable back, and pendant fastening devices are carried by the inner portion of the platform, whereby the device is securely fastened in a window. The platform projects a suitable distance beyond the window sill, so that a person seated upon it, will be located exteriorly of the window.

In the second patent, a base block is provided with a central opening beneath this block and on opposite sides of the opening are arranged spaced brushes. Mounted upon the block and over the opening are coacting wringer rollers which also constitute means for holding a mop cloth. The mop passes down through the opening in the block, and is arranged to pass alternately beneath the brushes as the device is reciprocated over the floor. To expel the water from the mop cloth, it is only necessary to rotate the rolls and this elevates the cloth therebetween. If it is desired to use the apparatus without the mop, the cloth is held in its elevated position. A combined article of this kind will appeal to every housekeeper.

Edwin S. Clower, Philadelphia, Pa., inventor; Horace F. McCann, Germantown, Pa., assignee. Gas Furnace.—The furnace of this patent burns ordinary illuminating gas as a fuel, and it presents in a comparatively small fur-

nace, a large radiating surface, and has a correspondingly large hot air chamber. It consists essentially of a casing having a combustion chamber, a burner coil located at the bottom thereof, and a deflector, formed of a hollow closed shell providing an interior dead air space, and extending upward from the bottom of the combustion chamber throughout the greater part of the length of the same. The lower end of the shell is tapered, and is arranged within the burner coil. A hot air chamber surrounds the combustion chamber. The furnace is also provided with an ingenious arrangement for supplying moisture to the heated air, to prevent the objectionable dry hot air being delivered to the rooms to be heated.

Frank B. Anderson, Davenport, Iowa. Teething Nipple.—This novel device consists of a hollow elastic bulb having one side extended to form a nipple, and provided at the opposite side with a whistle set into an opening of the bulb. The bulb prevents the nipple from being thrust too far into the mouth of a child, and the whistle, which is sounded by the compression and expansion of the nipple, is adapted to amuse the child. The device is a novelty and will pay the patentee to place on the market.

William A. Crist, Codorus, Pa. Thill Tug.—This improved device facilitates the connection and disconnection of the hold-back strap, and does not require the latter to be passed through a loop, and then buckled or unbuckled. It consists of a substantially L-shaped hook fixed to one of the faces of a thill tug, with its free end uppermost, in combination with a spring-actuated bolt extending entirely through the tug and normally engaging the free end of the hook to close the entrance to the same. The hook may be opened by withdrawing the bolt, and it is closed automatically by the spring when the bolt is released. By this construction, the hold-back strap may be quickly engaged, with and disengaged from, the hook.

Alonzo M. Davy, Clare, Mich.—Curtain Display Mechanism.—This invention provides a simple, efficient and inexpensive device having a series of supporting members for individual displays, and capable of being folded into small compass, and of being unfolded to present their contents successively to view. It consists of a vertical supporting strip, and a series of display members provided each with a vertical slat and a horizontal supporting portion, and having hinges connecting the adjacent vertical corners of the slats and hinging the series to the supporting strip. This permits the display members to lie flat against each other and against the outer face of the supporting strip, and also to be swung outward into separated radial positions for displaying curtains.

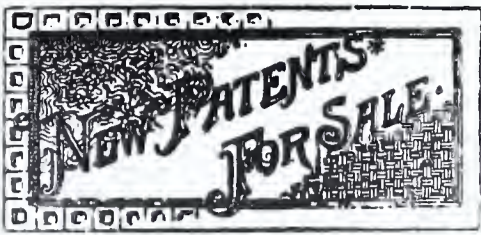
Lawrence Doerr, East Jordan, Mich. Gate.—The subject matter of this invention is a gate having both a sliding and pivotal movement. To this end two sections are employed, one of which is in the form of a re-inforcing frame arranged to be hinged to a post. Upon this re-inforcing frame is slidably mounted the gate proper, consisting of a frame on which is stretched wire netting. The two frames are formed of angle iron, and the upper and lower bars of one are provided with horizontally disposed flanges, constituting tracks. Rollers journaled in brackets, carried by the other frame, bear against these tracks. The entire gate is adapted to be hung at different elevations, so that it will operate freely without regard to the depth of snow beneath the same, and can be readily locked at any height.

Theodore P. Bellows, Memphis, Tenn. Car Coupling.—This device relates particularly to means for coupling heads of the automatic or Janney type, and the object is to provide a structure that is much cheaper than the link and pin couplings ordinarily employed. Moreover, by means of it, cars may be safely coupled where one drawhead is lower than its mate, having been proven particularly useful on cars employed in the construction of roads where there is usually great unevenness. Further than this, the device can be quickly applied and removed, and can be used for coupling cars on curves. The coupling comprises a substantially U-shaped frame or rod, the shanks of which are spaced apart sufficiently to pass through the pin holes of coacting coupling heads with the cross bar above the same. A plate is detachably fitted upon the free ends of the rods and connects the same, this plate being held in place by any suitable means, as for instance, a nut, or pins passing through the free ends of the shanks.

Charley McDonner, Wausaukee, Wis., inventor; Joseph Hrbacek, Bessemer, Michigan, assignee of the entire interest. Three patents. Saw Jointer and Gage—Metal Shearing Machine.—The frame which is adapted to rest upon a saw is made of slidably associated sections, so that it may be expanded or contracted to suit the size of the saw operated upon. A gage is adjustably mounted on the frame and comprises sections mounted respectively on the sections of said frame. At one side is located a file which extends longitudinally of the frame and is detachably secured thereto, bridging the section. Mr. McDonner, who is an expert saw-filer, has by means of this device simplified the operation, so that work may be readily performed with the aid of the machine by a comparatively inexperienced person.

Mr. McDonner's second patent is a machine designed for cutting metal plates, bolts, rods and the like, and it is capable of enabling such operation to be conveniently and effectively performed with a minimum amount of labor. The base of the machine, which has a longitudinal slot, is provided at opposite sides of its front portion with substantially L-shaped die members. The knife bar is pivoted in the slot of the base, and is normally held in an elevated position by means of a spring. The knife bar is forced downward by means of a pivoted cam, which is provided at its engaging surface with a plurality of concave sockets or seats for the reception of anti-friction balls. The anti-friction balls are loosely retained in the sockets or seats by a plate provided with perforations, corresponding to the sockets or seats, and of a diameter slightly less than the balls. The knife bar is provided at its underside with a longitudinal groove, extending to one end of the bar. A blade is fitted snugly in the groove, and is retained in place by a removable plate, which covers the outer end of the groove. This plate also prevents any endwise movement of the blade.

Charley McDonner, inventor; Victor N. Debot, Wausaukee, Wis., assignee of the entire interest. Shade and Curtain Pole Holder.—A pair of clamps are provided which are adapted to be secured to the upper cross bar of a window frame. Each of these clamps carries an outstanding ear to which is attached a supporting rod that is slidably passed through the ear of the other clamp. The outer ends of the loops are split and support hangers, in which a curtain roller may be journaled or upon which a curtain pole can be placed. The device can be applied to any window and adjusted to the width thereof without the use of any screws or nails, and without the necessity of marring or otherwise injuring the frame.



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FOR SALE OR ON ROYALTY—Patent No. 742,739, dated October 27, 1903. Rail joint. This invention aims to provide a secure and rigid joint for the meeting ends of railway rails, which will resist any tendency to play of said ends either vertically or laterally and result in a practically continuous rail, thereby obviating the jar commonly experienced when the wheels of a car pass over joints of the rails. Write, Wm. H. Rehmer, Asheville, Kans. apr

FOR SALE—Patent No. 748,782, Harvester, and No. 748,783. Sheaf Tie. Cheap, effective, and durable device for binding corn stalks and fodder. Fills a long felt want of the average farmer. Will sell in whole or part, or on royalty. Address, J. C. Parker, Woodston, Kans. apr

FOR SALE—United States patent No. 746,828. A pipe fitting rotatable to any degree of a circle from a straight line to a return bend, in fact all pipe fittings in one, except a tee. Address, W. C. Crawford, Muncy, Pa. apr

FOR SALE—Automatic Pump. Will fit any kind of a wheel that uses a pneumatic tire, and will pump air into the tire while speeding through the country. For bicycles, automobiles, buggies, etc. Address, S. A. Brost, Box 475 Sisseton, S. Dak. apr

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FOR SALE—U. S. Patent No. 740,627, dated October 6, 1903. Shredder Cylinder. Can be used in any fodder or feed cutter. Address, Willis A. Bush, R.D. No. 2 Pottstown, Pa. mar

FOR SALE—Patent No. 744,807, dated Nov. 24, 1903. Cotton Cleaner and Feeder. Address, Marion F. Seward, Elmendorf, Texas. mar

FOR SALE—Combined Milling and Boring Machine Patent. This is one of the most useful machines that has ever been patented as a time and labor saver. Correspondence solicited. Address, A. B. Soden, No. 2013 Garrard Ave., Covington, Ky. mar

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FOR SALE—Patent No. 741,048, issued Oct. 13, 1903. A track sanding device for tram or street cars. The only one that will give satisfaction. What am I offered cash! Address, C. W. Langridge, Station "A," Pueblo, Colo. mar

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Patents to Foreigners.

The President, in his annual message to Congress, made the following recommendation:

"In granting patents to foreigners, the proper course for this country to follow is to give the same advantages to foreigners here that the countries in which these foreigners dwell extend in return to our citizens; that is, to extend the benefits of our patent laws on inventions and the like where in return the articles would be patentable in the foreign countries concerned—where an American could get a corresponding patent in such countries."

The "INVENTIVE AGE" has, in the past, repeatedly called attention to the fact that we are giving to foreigners benefits and advantages which American inventors do not receive in foreign countries. Take Canada as an instance. If an American takes out a patent in Canada, he is required to cease importing samples of the invention to Canada within one year after the date of the patent; and he is compelled within two years to have the invention manufactured in Canada, or otherwise, the patent practically becomes null and void.

In England, a party may apply to the proper authorities and obtain a license to use a patented invention where the patentee is not working his patent; and the same is true of Australia and other English colonies.

In Germany, France, Austria and other European countries, provision is made in the patent laws of said countries that the invention must be "worked" within a specified time, say from two to three years after the date of the patent.

But how is it with respect to the United States? As is well known, we place foreigners on the same footing as Americans, and they receive their patents and can hold them for seventeen years without working them or practicing their inventions in this country.

Now, we are not prepared to argue in favor of engrafting on the patent laws

of this country, a provision requiring a patentee to work his invention within a certain time after his United States patent has issued: but we do think that in granting patents to foreigners, this country should only give to them the same advantages here that the countries in which these foreigners dwell extend in return to our citizens. That is to say, if a Canadian secures a United States patent, he should be required to cease importing samples of the invention to this country within one year from the date of the United States patent; and he should also be required to manufacture the invention in this country within two years from the date of his United States patent. This may complicate the situation somewhat, but how are we going to remedy conditions for American inventors, if we supinely stand by and allow foreigners to get the benefit of the beneficent patent laws of this country, while American patentees are harassed by the exacting provisions of the laws of foreign countries. In some foreign countries, certain inventions are not patentable because the industries to which they relate are operated by the government; yet those foreigners can patent the same inventions in this country.

It has been repeatedly stated that there is no country on the globe which offers such a cheap and efficient patent system as the United States. While a patent can be taken out in Belgium for less than it costs to secure a United States patent, yet, when the annual taxes and working requirements are taken into consideration, a Belgian patent costs many times that of a United States patent.

It is hoped that Congress will act on the recommendation of the President, and modify the law so as to give to foreigners just what the countries in which they dwell, extend in return to the citizens of the United States.

State and National Aid for Building Wagon Roads.

Four States, New York, Massachusetts, New Jersey and Connecticut, have in the past ten years spent about \$10,000,000 as State aid for building wagon roads. About \$6,000,000 has been added to this sum by the counties and towns where the State roads were built, and about 2,500 miles of State roads have been completed in these four States. Pennsylvania last year appropriated \$6,500,000 for the building of State roads. Wherever State roads have been built the selling price of farm lands has been increased from 20 per cent. to 50 per cent., and even more in some cases. The 2,500 miles of State roads already built have been of such benefit to the farmer that they have caused a great demand for more good roads. Five States found it good to aid in the building of wagon roads by State appropriations. Why should not the National Government aid in building roads in every State of the Union? Congressman Brownlow of Tennessee has answered this question by introducing in Congress a bill appropriating \$24,000,000 as National aid for building wagon roads. This sum is available at the rate of \$8,000,000 a year for three years, and is distributed to each State according to its population, except that no State shall receive less than \$250,000. The States or counties receiving this money must add a like amount. This appropriation will build between 6,000 and 7,000 miles of splendid National roads, and will build from 100 to 500 miles of hard road in each State of the Union. It seems to many farmers that it is time for the National Government to aid them, and they hope the bill will become a law.

Making Infringement a Criminal Offense.

That there are defects in the American patent system, is conceded. The most serious one is the matter of protecting a patentee in his invention. The grant of a patent is *prima facie* evidence of its validity, yet it is a well-known fact that if the invention proves a meritorious one, it is not long before infringements arise. Some manufacturers do not hesitate to appropriate patented devices without any thought of giving to the inventor what is justly due him; and the patentee is thus compelled to see his invention made use of by others, being powerless to help himself because of his inability to stand the expense of a suit; and if the infringer continues using the invention for a number of years, he is protected from suit by the statute of limitations.

The laws of foreign countries give a remedy to the patentee, which stop such flagrant infringements. For instance, in Germany, deliberate intention or gross carelessness in infringing upon a patent renders the offender liable to the payment of damages. Willful offenders in this respect can, on application of the injured party, be punished by a fine not exceeding 5,000 marks (\$1,190), or imprisonment not exceeding one year. If such a provision was ingrafted on the patent law of this country, willful infringements of patents would become less common than it is; and it is strange that no serious attempt has been made to protect inventors by making the malicious infringement of a patent a criminal offense. In such case, the United States Attorneys would have to prosecute the infringers, thus relieving poor inventors from the burden of suing infringers of their patents. This would not interfere with recourse by the inventor to civil action for damages.

It is quite often the case that certain parties who make a practice of infringing patents are irresponsible. A suit for damages against a party who is not solvent is a useless proceeding; and even an injunction has little effect on a man who, when the suit is ended, goes to some other place to continue his unlawful work. With the penalty something more than dollars and cents, that is to say, if it were within the discretion of the judge to send an infringer to jail for a year or less, where it is shown that the infringement was deliberate and malicious, it would not be so difficult for patentees to protect their rights under patents. Some people do not mind paying fines, or taking their chances on being required to pay damages for infringement; but if it should be made known that the infringement of a patent were a penitentiary offense, and that the United States Government was back of every patent and prepared to put anyone in jail for the deliberate infringement of the rights of a patentee, one of the greatest complaints by patentees would be met. And until Congress passes such a law, which will make the infringement of a patent a criminal offense, practically putting the Government back of every patent issued, patentees will have much to complain of; for there is force in the suggestion, which has been repeatedly made, that where the Government issues a patent it ought to support the patentee, and not leave him to the mercy of those who are disposed to appropriate his invention without proper remuneration.

The Baltimore Fire.

Sufficient time has elapsed since the terrible fire in Baltimore for engineers, experts, and laymen who have examined the ruins to consider the situation and make provision for the future.

That the same calamity is liable to happen in any city seems to be conceded, for the conditions existing in Baltimore prevail to a large extent in the business sections of all great cities. Given the same adverse conditions which existed in Baltimore, in the matter of prevailing winds and an insufficient fire fighting force, and the experiences of Baltimore might be duplicated many times over throughout this country. That the number of fire engines were inadequate was soon made manifest, and that Baltimore does not intend to be caught in the same fix again, is shown by the fact that one of the earliest acts of the municipal authorities, after the fire, was to vote for an increase in the fire department.

It is conceded by expert fire fighters that the limit as to size and capacity of a fire engine has been reached; but it seems to the writer that not enough attention has been given to the chemical side of fire fighting. With scores of nozzles issuing water playing on the Baltimore fire, it was shown that the flames could not be checked. Suppose, that instead of water, some chemical like bicarbonate of soda, or other ingredient, which would produce carbonic acid gas when ignited, had been thrown on the flames in considerable quantities? It is safe to assert that a stream of bicarbonate of soda produces ten times the effect on fire as a stream of water; for no fire can exist without oxygen, and the throwing of bicarbonate of soda on a flame acts to smother it, and it is well known that flames can be smothered quicker than they can be put out by water.

One fact which seems to have roused considerable comment was the absolute inadequate protection afforded by the so-called fire-proof buildings. From all reports, there appears to have been only one building which in any way stood the test, and that was the Continental. The steel framework of that building was faced with brick on the outside instead of stone, and reports as to its condition after the fire, show that while everything inside of a combustible nature, such as flooring, window frames, doors, etc., were utterly destroyed, the exterior of the framework of the building was left intact. Architects who have examined this building since the fire, state that it proves the value of using bricks over stone in the construction of fire-proof buildings. It has been suggested that if this building had had its windows provided with iron shutters, so that they could have been all closed, that the interior of the building might be intact today. It is manifest, though, that no building can be constructed which would resist such a fire as that of Baltimore, unless more of the interior decorations are made of fire-resisting substances. If doors, window frames, and flooring, were constructed of asbestos or mineral wool, the improvement over the present conditions would be great. We have seen it stated that windows should have the glass provided with wires molded therein, or in lieu thereof, small panes of glass be used in place of the large ones. By protecting the glass from the heat with wire, the fire could be kept from the interior of many fire-proof buildings.

There is still room for considerable improvement in the matter of the construction of fire-proof building, and we have no doubt that builders will take a lesson from the Baltimore fire. There is room also for the skilled inventor; and while we cannot hope to ever reach the condition where we are entirely free from the ravages of the fire fiend, we can at least mitigate them by providing the ounce of prevention rather than the pound of cure.

SCIENTIFIC

PROGRESS.

Anti-Frost Solution.

As an excellent remedy against the freezing of shop windows, the "Pharmaceutische Zeitung" recommends the application of the following mixture: 55 grams of glycerine are dissolved in one quart of 62 per cent alcohol, containing, to improve the odor, some oil of amber. As soon as the mixture clarifies, it is rubbed over the inner surface of the glass. This treatment, it is claimed, not only prevents the formation of frost, but also stops sweating.

Disinfecting Apparatus.

A new apparatus, of French origin, is based upon the evaporation of formic aldehyde. The solution of formic aldehyde is boiled in a vessel heated by spirit or other lamp, the escaping vapors being led through a tube, made flexible so that it can be passed through the keyhole of the door of the room to be disinfected. A gauge shows the level of the liquid, and scales are provided to show the level of the liquid to be evaporated to disinfect the room properly.

Preservative Composition.

A new German composition or paint, for protecting stone, wood, cement, or the like from the effects of damp or other deleterious influences, consists of quicklime, chalk, mineral colors, turpentine, boiled oil, galipot, rosin, and benzine. The lime, chalk, colors, and turpentine are first mixed, and then made into a paste with the boiled oil. The paste is finely ground, and mixed with the rosins previously dissolved in the benzine.

Repairing India-Rubber Articles.

When mending rubber shoes, balls, hose, tyres, etc., the "Deutsche Chemische Wochenschrift" recommends to proceed as follows. The articles are first freed of adhering mud particles and thoroughly dried. Varnish, as for instance, on rubber shoes, is removed by means of emery paper or a file, and the part thus treated is well rubbed over with benzine. The edges of the hole are then painted with a solution of Para caoutchouc in benzine, a fitting strip of natural rubber is laid over it, and a solution consisting of four parts of benzine, three of carbon sulphide, and 0.180 parts of sulphur chloride is applied to the edges by means of some cotton wool tied to a wooden holder, this solution serving to vulcanize and to increase the resistance of the rubber. The joined parts must, of course, be well pressed together.

Tanning Extracts.

An Australian invention has for its object the preparation of tanning extracts from the waste liquors resulting in the manufacture of sulphite pulp. An important feature is the treatment of the liquor in such a manner as to avoid making the extract dark in color. After a determination of the percentage of free and combined sulphurous and acetic acids in the raw liquor, a quantity of zinc dust sufficient to convert all the sulphurous acid into hyposulphurous acid is added, and

the liquor is agitated. A strong acid, such as sulphuric, phosphoric, or oxalic acid, is gradually added, and the liquid, if necessary, is cooled to prevent a rise of temperature above 30 degrees C. A sulphate, phosphate, oxalate, or other soluble salt may be used for precipitating the lime in solution, and the precipitate is removed by filter process, and the extract evaporated.

Electric Traction for Canals.

The system in general use, consisting of running an auto-motor on the path along the canal, requires a very good path, and is expensive in the cost of road construction and maintenance: in addition, there are unavoidable vibrations of the engine. With two rails, the road-bed construction is less expensive, but the adhesion is not sufficient for dragging heavy boats, except with very heavy engines. Still greater economy in road-bed construction is effected if a single rail be used, but there still remains the adhesion difficulty. A French inventor overcomes the difficulty by employing two-axle pairs, inclined against one another, instead of the usual two-wheel axles, each with two vertical axles. A wheel is mounted on each axle, and each pair of two wheels grips the single rail. The engine is supported by one broad lateral wheel which runs on the road, the object aimed at being to increase the adhesion and stability of the engine.

Charging Electric Automobiles.

Thomas A. Edison, of Orange, N. J., is the inventor of an improvement in electrical automobiles, which has for its object to provide an electric automobile in which the driving motor may be conveniently and effectively utilized for the purpose of charging the batteries.

To this end the invention consists in providing a small steam or other elastic pressure engine, preferably of the turbine type, either connected at all times to the armature of the electric motor, or adapted to be connected thereto through a suitable clutch, so that by reversing the electrical connections, or by reversing the rotation of the motor-armature, the electric motor will be converted into a generator for charging the batteries. A clutch connection can also be effectively utilized for disconnecting the electric motor from the driving-wheels during the charging operation, although it will of course be understood that the driving-wheels may be jacked up, so as to be driven during the charging operation.

New Anaesthetic.

Hungarian dentists and chemists claim to have discovered a valuable local anaesthetic, an alkaloid nervocidine which is stated to have similar properties to cocaine, but to produce a much more lasting anaesthesia. The base is obtained from an Indian plant, "Gasu Basu," the properties of the leaves of which were first discovered by D. Dalma, who successfully employed them in painful pulpitis with such good results that he reported

that the drug might displace arsenic for dental purposes. The remedy is a yellow, hygroscopic powder, readily soluble in water. It produces marked anaesthesia of the cornea in 0.1 or 0.2 per cent solution, which is very persistent, and a 0.1 per cent solution brushed on the mucous membrane of the cheek also gives marked anaesthesia. Stronger solutions, exceeding 0.5 per cent produce irritation of the cornea, a 2 per cent solution causes ulcerative keratitis in dogs and rabbits, which lasts ten days, during which period the anaesthesia also lasts. It does not appear to produce anaesthesia by subcutaneous injection. Its general effect is that of a paralyzing poison. Although its anaesthetic effect is much more prolonged than that of cocaine, the length of time necessary before this effect supervenes, the irritation caused by the drug, and the toxic symptoms it produces, do not point to the probability of its being of general service except in dental practice.

Printing on Tins.

A method of printing on tins has been invented by Isidor Kitsee, of Philadelphia, Pa. The object of said invention is to produce on tin an inscription or design which will not be destroyed by handling, or by the contents of the can itself. The invention has more especial reference to the printing of tins designed to be made into cans for lard or other purposes.

The printing of cans is at present accomplished by the aid of the lithographic process, and the great disadvantage arises that in time the design or printing matter becomes mutilated through the oozing out of the greasy contents, and such cans have to be returned as unsalable. To obviate this difficulty is one of the objects of the present invention.

In the embodiment of the invention, rollers are employed, and a tank containing the chemical necessary for the printing. This tank is provided with feed rollers. A conveyer is also employed, a water-tank, and a support or table for the tin plates. A series of sheets designed to be made into cans are placed on the operating-tank, and one after the other fed between the rollers. The tank contains a copper solution, preferably a concentrated solution of sulfate of copper thickened with an addition of gumarabic. The lower feed-roller is partially immersed in the solution, and as this roller is always revolving and is in contact with the two feed-rollers, it is obvious that part of the solution will be transmitted to each of these rollers, and as the roller with the raised surface is in contact with the uppermost of the feed-rollers, part of the solution will be carried to the raised surfaces of the printing-roller, and these raised portions will be provided with a solution capable of leaving an imprint on any surface they may come in contact with. If a solution containing a copper salt is brought into contact with the surface of one of these tins, a chemical change takes place, whereby part of the thin and underlying iron is converted into salt—sulfate or chlorid, as the case may be—and the metallic copper is deposited on the surface.

The surface of one roller is provided with the letters or design to be printed on the surface of the tins in relief; but as the ink consists of an acid solution, the raised letters should consist of vulcanized rubber.

Alcohol from Saw-Dust.

It is reported that a chemist, of Christiana, Norway, has succeeded in finding a new and cheap process for making alcohol from saw-dust.

In a factory which has recently commenced operations, saw dust is treated under pressure with diluted sulphuric acid, by which the cellulose is transformed into sugar, which, by adding fermentation producers, is converted into alcohol in the old manner, and then distilled.

100 pounds of saw-dust yield from 6 to 7 pounds of alcohol: valuable by-products are methyl-alcohol and acetic acid. While in Norway 100 pounds of potato alcohol cost \$5.00, the price of the same quantity of saw-dust alcohol is only \$3.00.

The process is said to be of importance to many industries in which saw dust is produced, of which hitherto no real use could be made.

Submarine Exploration.

An Italian has invented two machines for exploring the bottom of the sea that promise more successful results than are usually attained by this class of apparatus. One is a big steel egg, meant for use at greater depths than divers can usually endure. The egg is constructed so strongly as to withstand great pressure of water, and is further equipped with steel arms and hands for moving objects on the bottom of the ocean. It holds two men, who look out through thick glass windows and see whatever is in sight. It has a telephone which communicates with the surface, and is furnished with electric power, which enables it to proceed on a single wheel over the bed of the sea. The supply of air that it contains is enough to last a moderate period, and more can be obtained, when needed, from the surface. In a similar manner, it can be supplied with light. The inventor thinks that his machine will be well adapted for recovering treasures that are lost in wrecks. He believes that he can descend to a sunken ship, put dynamite in the proper place, blow off the deck, and direct the operations of men at the surface in extracting the contents of the vessel. He will be able to mark the position of heavy articles by line and buoy, so that they may be grasped by grapnels and hauled up.

The other invention is an apparatus for examining the bottom of the sea from the surface, and is called the hydroscope. In recent experiments in the harbor of Genoa, it was found possible to discern objects at a depth of 300 feet by natural light, and at a greater distance by means of artificial illumination. Several European governments, it is said, have contracted with the inventor for the use of the hydroscope in rescuing submerged objects. It is also believed that the apparatus can be used on modern steamships, for the entertainment of passengers, who will be enabled to observe the topography and inhabitants of the submarine world over which they are passing.

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LIST OF PATENTS

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Acid and making same. Homologous propiolic.....C. Mouren
Acid. Ether of amylpropionic.....C. Mouren
Acid. Ether of propiolic.....C. Mouren
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Bridge.....E. H. Arnold
Bridge cross tie.....J. B. Logan
Bridle and bit.....B. W. Kindig, Jr
Bucket. Minnow.....T. B. Wilson et al
Bucket suspension device. Two rope.....J. S. Foster
Buckle.....H. L. Perryman
Buckle.....J. S. Soulek
Buckle. Back band.....W. H. Hart
Buckle fastener. Belt.....H. M. Rosenblatt
Buckle. Garment.....W. H. Johnson
Building block and wall.....F. E. Kidder
Building section.....W. A. Warner
Burglar alarm. Safe.....H. R. Cassel
Butter. Making.....J. Estep
Button.....R. R. Fogele et al
Cabinet.....F. J. Saiger
Cable clip.....2 pats. O. C. Hoffmann
Cable grip clamp.....E. J. Brown
Cable making machine.....J. H. Schoonmaker
Cage trap.....A. B. Hendryx
Calculator.....E. C. Duncan
Cameras. Means for attaching supplementary parts to photographic.....H. W. Locke
Car construction. Metallic.....C. M. Carnahan
Car coupling draft rigging.....E. S. Woods
Car door. Grain.....E. E. Kenfield
Cardoor. Grain.....J. Barry
Car steam heating system. Railway.....N. Nilson
Car switching apparatus.....M. Brosnan
Cars. Electrical controller for railway.....H. P. Wellman
Cars. Sleeping appliance for passenger.....I. B. Guenzburg
Carbureted air. Apparatus for producing.....E. F. Wilson
Carbureted air. Producing.....E. F. Wilson
Card shuffler. Playing.....H. F. H. Newington
Case.....J. F. Prentice
Casein compound and producing same.....H. K. Brooks
Cash register.....T. Carroll
Casket handle.....2 pats. J. McCarthy
Casket. Hermetical.....W. A. Warner
Centrifugal machine.....2 pats. J. J. Berrigan
Checkrein.....W. H. Fuller
Chemical changes. Effecting.....A. H. Cowles
Chill.....J. W. Fuller, Jr
Chuck. Lathe.....F. R. Inman
Cigar cutter and match igniter. Combined.....J. T. Galetti
Circuit controller. Vibratory.....2 pats. R. Varley
Clamp.....H. M. Hanson et al
Clevis. Plow.....M. Wheeler
Clothes line securing device.....J. Blasius
Coal handling apparatus.....J. M. McClellon
Coffee, &c. Apparatus for making.....F. W. Dallinger
Coil. Ruhmkorff.....R. Varley
Comb.....W. S. Bechtold
Composite block for soft threads and making same.....C. W. Zaring
Concentrator.....W. G. Anderson
Concrete structures. Iron bearer for T. Franke
Confection coating machine.....J. P. Annen
Conveyer.....W. J. Patterson
Cooking device.....J. Henault
Copy holder.....F. C. Shober
Copy holding device.....J. R. Foster
Cotton chopper.....D. Washington
Cotton picker's bag.....F. M. Dalton et al
Cover. Vessel.....B. L. Johnson
Crate.....J. C. Nagle et al

Cultivator.....C. V. Barnhart
Cultivator. Rice.....H. D. Dodd
Cultivator. Two row lister.....A. V. Ryder
Curtain bracket.....A. Lambert
Curtain bracket. Adjustable.....R. T. Green
Cutting machine.....E. F. Gibbons
Cutting machinery.....T. C. Hansen
Cycle free wheel and brake attachment.....W. Powell
Cycle saddle for supporting rifles, &c.....J. Jarvis
Cycles or the like. Saddle for.....T. G. Stevens
Dental articulator.....L. Knight
Dental cement injecting tube.....H. H. Crutenden
Dental polishing and grinding instrument.....H. H. Gantz
Detachable handle.....L. H. Soisson
Disinfectants to water closets. Apparatus for applying.....G. S. Gallagher
Display rack.....M. J. Redding
Ditching machine.....M. B. True
Draft attachment. Spring.....C. W. King
Drawers.....J. Gugenheim et al
Drier.....C. E. Geiger
Drying machine.....F. Wertenbruch
Drilling apparatus. Portable electrically driven.....G. F. Campbell et al
Drilling machine.....T. C. Hansen
Dye and making same. Anthraquinone.....O. Bally
Dye. Green.....A. Luttringhaus
Egg boiler.....J. Anderson
Electric blanket.....C. Foglesong
Electric furnace.....A. H. Cowles
Electric resistance furnace.....A. H. Cowles
Electric wires. Securing.....A. Kline
Electrical energy. Means for converting faint vibrations into.....W. H. Fahney
Electrical variations. Means for reproducing.....P. C. Hewitt
Electrical variations. Reproducing.....P. C. Hewitt
Electrode and producing storage battery electrodes.....F. A. Feldkamp
Electrode for electric tube lamps.....D. M. Moore
Electromagnet.....I. A. & E. W. Timmis
Electromagnetic brake.....J. S. Lockwood
Engine muffler. Hydrocarbon.....E. L. Russell
Engine tender. Traction.....P. H. Sampson
Excavating, raising, screening, and filling gravel ballast, &c. Machine for.....H. Quertier
Explosive.....D. Deany
Extensible trough or flume.....P. Maginnis
Eyeglass or spectacle case.....W. E. Birmingham
Fan actuating mechanism.....J. F. Carr
Fanning mill.....W. J. Hammill
Farm machinery seat.....C. Wilson
Faucet. Regulable self-closing.....E. L. Walter
Feed trough.....T. L. Carpenter
Feeder. Steam boiler.....J. J. Buike
Fence.....J. S. Barnes et al
Fence post.....H. McFeron
Fender.....G. Parisien et al
Fertilizer distributor.....J. Campbell
Filter tablet.....W. G. Tousey
Fire alarm. Electric.....J. A. Barten et al
Fire alarm mechanism.....L. G. Woolley
Fire alarm system.....L. G. Woolley
Fire escape.....V. Jetley
Fire escape.....B. Brielmaier
Fireproof building construction.....C. F. Buente
Fireproof floor construction.....J. Schall
Fishing reel.....R. L. Hunter
Flood gate and fence.....L. W. & E. Phegley
Floor plates. Means for producing metallic.....M. G. Worth
Floor scraping and finishing tool.....J. S. Hartman
Flue expander.....2 pats. J. W. Paessler
Fluid circulating apparatus.....H. Stier
Fluid motor. Expansive.....J. A. Norton
Fluid pressure regulating device.....2 pats. P. Synnestvedt
Flush tank apparatus.....J. H. Seager et al
Folding chair.....T. W. Washburn
Food products. Plant for curing.....C. B. Trescott
Foot warmer or heater.....O. O. Petty
Fruit cleaning apparatus. Dried.....G. Herbert, Jr
Fruit picker.....P. Pinch
Fuel feeding system. Liquid.....D. E. Johnson
Furnace.....T. Murphy
Furnaces. Mechanical rabble for ore roasting or calcining.....A. E. Johnson
Furniture. Folding.....G. H. Buck
Fuse. Electric circuit.....E. C. Phillips
Gage.....R. A. Lachmann
Gage and marker for dressmakers or others.....M. M. Reis
Game apparatus.....J. S. Mather
Garment fastening.....C. M. Shubert
Garment supporting hook pin.....E. C. Herring
Gas apparatus.....F. W. Beardsley
Gas burner. Incandescent.....J. W. Bray
Gas generator. Acetylene.....O. K. Stuart
Gas. Manufacturing.....P. Naef
Gas or vapor electric apparatus. Regulator or.....P. C. Hewitt
Gearing. Differential.....H. T. Craven
Gearing. Electromagnetic.....E. Thordon
Glass grinding or polishing apparatus.....F. F. Fischer
Glass grinding, smoothing, and polishing table.....D. J. Murnane et al
Gold saving apparatus.....L. Sachse
Gopher trap.....J. J. Daniels
Grading and ditching machine.....2 pats. B. O. Rhodes
Grain header.....J. A. Sharp
Grain separator feeder.....J. B. Cornwall
Greenhouse frame.....H. Simpson
Grinding device. Disk.....F. E. Wilkison
Hammer and rock drill. Power.....J. Kraus
Hammer. Chain maker's power.....W. N. Appleton
Hammer. Pneumatic.....C. A. Speer et al
Handle.....W. N. Lewis
Harrow. Self-cleaning.....A. Dixon
Harvester. Corn.....S. C. Anderson
Harvester tongue support and side-draft check. Grain or grass.....C. F. Ortman
Harvester. Corn.....H. M. Burdick

Harvesting potatoes or the like. Machine for.....C. F. Grohmann
Hat pin.....R. Omlor
Hay rake.....H. A. Adams
Hay rake.....W. Lincoln
Heating. Electric.....A. H. Cowles
Heating liquids, especially milk. Apparatus for.....J. Fliegel
Heating materials. Vacuum and circulatory.....G. L. Bottum
Heddles. Producing.....W. Fehr
Heel blank assembling machine.....G. B. Grover
Heeling machine.....H. Briggs
Hinge pin.....J. C. Griffin
Hitching device.....W. J. Willey
Hitching stray.....E. J. Fenn
Hoe. Wheel.....A. F. Piggott
Hook.....A. F. Dunn
Hobble loops. Manufacture of.....J. P. Kline
Horse cleaner.....G. E. Fredericks
Hose clamp.....V. H. Davison
Hose supporter.....J. B. Carolin
Hot air furnace.....T. F. Meinhardt
Hot water furnace.....F. Lumver
Hydrant.....W. W. Corey
Ice cream freezer.....J. Prade
Ice from antennae. Device for clearing.....L. de Forest et al
Illuminating prism plate.....F. L. O. Wadsworth
Incubator.....G. Hacker
Injector.....S. L. Kneass
Insect destroyer.....J. Ham
Iris diaphragm.....E. Bausch et al
Irrigating device.....W. G. Templeton
Justifying mechanism.....F. B. Converse Jr
Kettle.....R. Brandt
Keyboard. Transposing.....J. H. Brady
Knitting machine. Automatic circular.....J. B. Hipwell
Knitting machine. Lamb.....A. Greand
Knitting machine stop motion.....D. H. Hill
Knitting machine stop motion.....G. W. Ruth
Knitting machine stop motion device.....E. Wrigley
Knitting tool.....A. S. Horlacher
Label or stamp affixer.....F. C. Arey
Lacing. Shoe.....H. W. Pinkerton
Lamp. Electric tube.....D. M. Moore
Lamp socket.....D. A. Schutt
Lamp socket. Incandescent.....O. E. Kenney
Lamps. Illuminated sign or number plate for automobile.....T. H. Edmunds
Land anchor.....W. G. Beach
Lantern plug.....J. P. Sneddon
Ledgers, account and record books, files, &c. Lock for the adjustable backs of loose leafed.....A. D. Hulquist
Legging. Puttie.....J. T. Allison et al
Legging spring.....M. Rosenwasser
Letter package tie.....C. S. Kellum
Ligature tube.....B. K. Hollister
Liquids. Apparatus for automatically controlling the flow of.....A. Priestman
Liquids. Stopping device for sparking.....J. Roger
Lock strike plate.....C. Hamel
Locomotive boiler.....J. Wister
Loom.....A. Wolfensberger
Loom for weaving figured goods.....A. Barbier et al
Loom weft replenishing mechanism.....W. H. Baker et al
Lubricator.....S. M. Hall
Mail pouch closure.....J. L. McCormick
Manure spreader.....C. W. Smith
Masoury structures. Temporary supporting form for.....G. W. Jackson
Mattress.....F. J. Lewzey
Mausoleum or burial vault.....G. Y. Bonus
Meat cutter or chopper.....P. F. Meher
Mechanical movement.....W. H. Voss
Metallurgical furnace.....W. S. Dempsey
Milk jar locking device.....G. Holle et al
Mixing machine.....C. E. & C. T. Foote
Mop holder.....C. Morgan
Motor.....B. J. Zeitel
Muffler. Exhaust.....T. J. Willis et al
Music pieces. Device for mechanically substituting one disk for another in.....A. J. Rod
Music turner. Sheet.....E. Douden
Muzzle. Animal.....B. P. Merry
Napkin ring.....W. M. Kendall
Necktie holder.....J. W. Van Plew
Nose ring for animals.....E. K. Rea
Nut lock.....J. N. Smith
Nut lock.....W. C. Miner
Nuts, &c. Locking device for.....P. Van Duijn et al
Office indicator.....C. F. Ruttman
Oil can. Non explosive.....J. Childs
Oil. Refining.....J. C. Fleming
Ophthalmoscope.....H. L. De Zeng et al
Packaging clip.....C. E. Beisel
Packing. Manhole.....J. K. Munson
Packing. Valve stem.....E. P. Coleman
Paint sprayer.....H. R. Cooper, Sr
Paper boxes. Machine for manufacturing.....J. M. Carncross
Paper cutting and folding machine.....S. D. Ruth
Paper feeding and stencil printing apparatus.....A. B. Dick
Paper feeding apparatus.....A. B. Dick et al
Paper feeding apparatus.....A. B. Dick
Paper package or sheets and cabinet therefor. Toilet.....J. T. Hoyt
Pencils, crayons, &c. Device for use in connection with the sharpening of lead.....F. E. V. Baines
Phonograph.....E. Gilman
Phonograph record cylinder. Celluloid.....A. N. Petit
Phonographs, &c. Apparatus for duplicating sound record cylinder of.....A. N. Petit
Photographic film. Graded.....E. F. Beckwith
Photographic prints for toning. Preparing.....T. Baker
Pianoforte.....F. McNamara
Pile protector.....A. S. Cooper
Pile strengthener.....A. S. Cooper
Pipe or rod holder.....E. E. Townsend
Pipes, &c. Protective covering for.....W. H. Washington
Plane. Bench.....E. O. Sjolander

Plane. Hand.....E. Haydock
Piston chambers and rings. Machine for grinding.....J. B. Phillips
Planing machine.....H. B. Ross
Plotting instrument.....N. G. Davidson
Power transmission device.....J. F. Krcma
Precious metals by electrolysis. Apparatus for extracting.....H. R. Cassel
Precious metals by electrolysis. Extracting.....H. R. Cassel
Printing machine. Stencil.....A. B. Dick
Propeller. Screw.....E. A. Nilsen
Prospecting instrument.....M. Chase
Pulley. Split.....S. Siroba
Pump attachment.....E. F. Kimball
Pump automatic controller. Feed.....R. J. Mullin
Pump. Automatic electric.....F. L. Orr
Pump. Bucket.....L. A. Brigel, Jr
Pump coupling. Windmill.....C. W. Decker
Pump cylinder, tank, and base plate.....F. G. Irvine
Punch.....E. D. Etnyre et al
Rail contact shoe.....G. W. Brady et al
Rail fastening.....A. Koppel
Rail joint.....F. Dodson
Rail tie.....J. R. Hubbard
Railway.....S. E. Jackson
Railway brake.....F. Gregoire
Railway draft rigging.....W. T. Van Dorn
Railway draw head and air coupling. Combined.....L. Lecompte
Railway gate. Electrically operated.....M. Spinrad et al
Railway signal. Electrical operated and controlled.....R. D. Peters
Railway signal apparatus.....J. F. Mickey et al
Railway tie and rail fastener. Metallic.....O. Granberg
Raising or lowering heavy bodies. Apparatus for.....C. V. Fowler
Ratchet tool.....Z. T. Furbish
Razor frame. Safety.....A. W. Schenber
Refrigerator attachment.....C. W. McClure
Relay. Device.....J. P. Downes
Relay. Electrostatic.....D. la Cour
Remnant table.....C. E. Mitchem
Reservoir bottom and expansion joint.....W. N. Wight et al
Ribbon winding device.....E. S. Nordhoff
Rolling mill.....C. von Philip
Roof joint. Sheet metal.....J. H. McEvoy
Rotary engine.....C. W. Allen
Rotary engine.....W. I. Cooley
Rotary engine.....W. S. Chapman
Rotary engine.....W. von Pittler
Sail fastening for mast hoops. Detachable.....A. Klatt
Sanitary closet. Electric.....J. H. Wilson
Saw clapboard machine. Band.....A. J. Burton
Saw gunner.....J. Anderson
Saw set and jointer. Combined.....J. Anderson
Saw setting device.....W. F. Arantz
Saw sharpener.....W. J. Winter
Scenery trimmer. Theatrical.....J. R. Clancy
Screw driver. Reversible.....Z. T. Furbish
Seal.....E. J. Brooks
Sealing wrench. Jar.....L. D. Burlingham
Separator.....D. L. Adelsperger
Sewing machine. Buttonhole.....2 pats. C. A. Dahl
Sewing machine drop table.....W. Grothe
Shade bracket. Window.....J. E. Gill
Shade roller spear.....C. Flagler
Shaft hanger.....J. W. Bechtol et al
Shaft reversing mechanism.....J. S. Sheppard
Shaft straightener.....G. R. Granger
Shaft supporter.....W. E. Hoyt
Ship's distance recorder.....W. C. Forbes
Shoe polisher.....H. M. Backus
Siege. Grain.....H. K. Clement
Sign. Display.....J. Ward
Signal.....J. J. Layten
Signaling apparatus.....R. W. Earle et al
Signaling system. Electrical.....H. P. Clausen
Skirt.....W. T. Smith et al
Sleigh runner attachment. Vehicle.....H. Thiedemann
Sleigh. Wheeled.....J. H. Wolf
Small arms.....F. Neuber et al
Smelting furnace.....M. L. Trapp
Smelting materials and producing carbide.....A. H. Cowles
Smoke preventing means.....H. H. Hughes
Soldering iron. Electrically heated.....W. J. Bowen
Spark arrester.....D. S. Child
Spark production. Controlling.....L. de Forest
Speed indicator.....T. H. McQuown
Speed regulator. Friction.....F. W. Linnert
Spinning machines. Fiber gathering can for.....G. Stiehle
Spinning mule.....H. S. Golland
Spreading machine.....C. F. Buck
Stacker. Pneumatic.....J. H. Ley
Stair structure.....N. Bois
Stamp mill.....G. C. Richards
Staples, nails, &c. Machine for setting.....C. H. Wilkinson
Stave. Composite barrel.....F. Brenner
Steam boiler.....F. J. Doyle
Steam boiler.....F. T. Chase
Steam engine.....C. Crompton
Steam engine for curd cutting machines.....W. L. McLean
Steam generator furnace.....F. May
Steam or internal combustion engine or motor.....T. S. James
Stone cutting and shaping machine.....P. Lanigan
Stovepipe lock.....W. A. Petrie
Strainer. Fluid.....I. W. Pullman
Stream motor.....T. A. Fidjeland
Stretching stand.....H. C. Hall
Stud, &c. Metallic.....M. Hegbom
Surgical retainer.....A. C. Bernays
Switch handle. Snap.....C. A. Clark
Switch indicating dial. Snap electric.....C. G. Perkins
Switching mechanism. Electromechanical.....W. J. Bell
Tank ventilating attachment.....C. Noller
Telephone exchange.....N. E. Norstrom
Telephone system. Central energy.....K. B. Miller

Telephone hook switch E. E. Yaxley
Thresher and separator. Harvester W. V. Allen
Threshing machine tooth W. J. Cook
Throat bag A. C. Eggers
Thumb support and root brace for enamel-
cleavers F. E. Roach
Tile G. G. Fryer
Time recorder J. W. Deubner
Tin can H. E. Bandlow
Tire G. M. Depew
Tire. Cushion J. Coomber
Tire. Vehicle J. O. Work
Tire. Vehicle E. F. McArdle
Tobacco leaf stemming machine. 2 pats.
 W. C. Briggs
Toilet article E. E. Cleveland
Tongue. Vehicle M. R. Bruner
Tool holder B. M. W. Hanson
Tool. Pneumatic L. W. Turnbull
Tower. Aerial whirling J. H. Welsh
Toy golf player P. A. Vaile
Track. Cantaliver car E. J. Beard
Train pipe couplings. Device for automatic-
ally preventing escape of air from R. C. Pollock
Traps. Automatic control for return C. A. Southwick
Trolley for overhead electrical conductors sys-
tems E. Cantono
Trolley stand J. Kermath
Trousers creaser and presser E. Graham
Truck and hoist. Combined D. Z. Clay
Truck. Railway C. Nordell
Trunk garment holding attachment D. W. Curtiss
Trunk strap R. Forbes
Tug. Hame F. Hauff
Turbine E. J. Wood
Turbine engine S. Lount
Turbine. Steam S. N. Smith
Turn table S. Elliott
Turning machine. Automatic B. T. Magers
Turning machine. Wood J. R. Binns
Twine holder P. H. Cazier
Type holder J. E. Schlorff
Type setting machine F. B. Converse, Jr
Type writer attachment N. J. Smith
Type writer carriage return D. S. Dufur
Type writing machine H. Hochklassen
Type writing machine G. C. Blickensderfer
Umbrella handle. Detachable E. P. Bevilard
Umbrella. Knockdown H. Fesenfeld
Universal mill A. T. Keller
Valve J. F. Rylands
Valve E. F. Holinger
Valve J. E. Schneider
Valve. Air brake T. Haley
Valve and cooperating parts. Check W. & J. Boeckel
Valve gear for Corliss engines. Releasing C. H. Robinson
Valve mechanism for steam engines. Dis-
charge C. A. Ferrari et al
Vapor burning furnace J. H. Fink
Vehicle brake N. L. Birchfield
Vehicle brake. Automatic E. J. Johnson
Vehicle. Motor J. W. Packard et al
Vehicle. Motor H. M. Pope
Vehicle mud and dust guard. Combined J. H. Scott
Vehicle mud guard H. P. King et al
Vehicle seat lazy back B. C. Place
Vehicle seat lazy back attachment B. C. Place
Veneer drier A. S. Nichols
Vessel loading or unloading means H. M. Harding
Vessel sheathing R. D. Upham
Wagon. Dumping E. D. Branch
Wagon. Dumping G. Kautz, Sr
Wagon steering gear A. McEntee
Wardrobe, closet, &c. W. C. James
Washing machine W. T. Rusk
Washing machine bling gage and mixer E. W. Grace
Washing machine gearing F. T. Brosi
Water closet ventilator C. H. Muckenhirn
Water purifying apparatus J. C. W. Greth
Weather strip F. Fournier
Well mechanism M. E. Layne
Well feeding machine G. D. Clapp
Wheel rim. Vehicle S. Butler
Windmill E. Rue
Window screen. Metal S. W. Benson
Wire winding tool M. E. Layne
Wire working machine T. S. Haley
Wrench F. Stuart
X-ray apparatus. Portable E. W. Caldwell
Zinc blends from ores. Separating W. Jamieson et al

DESIGNS.

Braid H. P. von Nostitz
Cabinet. Kitchen wall R. M. Vernon
Comb. Pompadour puff B. W. Doyle
Glass vessel. Cut. 2 pats. W. C. Anderson
Key 2 pats. C. J. Caley
Lighting apparatus. Globe support for incan-
descent L. R. Hopton
Spoons or similar articles. Handle for S. J. Large
Wire fabric O. R. Hunt

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MECHANICAL PATENTS.

Abrasive wheel D. B. Hyde
Account. Credit W. R. Swan
Acetylene generator W. S. May
Acid. Making dialkyl barbituric M. Engelmann
Adding machine P. H. Thompson
Adjustable wrench J. W. Davis
Animal heat protector F. K. Walther
Animal trap M. Laramie
Annunciator L. Schmidt
Atomizer F. B. Comins
Atomizer F. V. Braymer
Attrition disks and the product thereof. Manu-
facturing J. C. Graft
Axle box and spindle G. Martini
Bag turner H. Roppel
Baking mold C. Forcke
Baking pan. Multiple A. E. Bronson
Baling press J. S. Tuttle
Banana shipping case F. Schmitz
Bar cntter H. A. Christensen
Barrel hoop E. I. Braddock
Barrel support E. E. Cross
Barrels, &c. Making metal H. S. Reynolds

Basket handle B. J. Ragatz
Battery receptacle and bell support. Combined
electrical W. A. Harvey
Bearing. Shaft J. J. Harrington
Bed. Fold ng V. J. Gillett
Belt and garment fastener for supporting skirts
or trousers G. Schmitt
Belt fastening device. Driving A. H. B. Sharpe
Belt holder or attaching device H. Parkes
Belting C. E. Newton
Bicycle attachment A. L. Porter
Bicycle attachment J. McLarty
Bicycle lantern safety arrangement A. Reimann
Bicycle. Motor W. A. Suddard
Binder. Temporary J. L. C. Montague
Binding post L. Steinberger
Blind lock. Window W. F. Stough
Blow testing apparatus H. G. Cady
Boiler brace E. Cook
Boiler cleaning compound J. McCormack
Book. Check E. F. Green
Book cover cleaning and polishing machine T. Daniels
Book. Roll note O. Hulback
Boot or shoe holder W. C. Benkert
Bottle C. B. Rhoads
Bottle. Non refillable C. M. Drennan
Bottle valve J. J. Brown
Box fastener E. T. Reilly
Box lid support and label holder. Combined J. Jones, Jr
Brake beam. Metallic A. Stucki
Brake shoe O. M. Stimson et al
Brick handling apparatus L. F. Hart
Brick kiln furnace E. M. Clark
Bridge construction J. F. Morton
Brooder W. H. Bennett
Building block and wall C. N. Allender
Building material. Composite R. Hartman
Buoy for sunken vessels J. F. Tribble
Bushing for junction boxes. Outlet F. W. Erickson
Button. Collar S. H. Hall
Button. Collar J. Eckstrom
Button. Cuff E. P. Happich
Button. Suspender A. Bowers
Cabinet I. Mason
Can filling machine F. B. Fulton
Canning device. Fruit or vegetable F. G. Stiemmer
Candle molding machine S. H. Leavenworth
Car. Combined freight and dump A. Lipschitz
Car coupling A. Moffitt
Car door. Grain S. A. Bushey
Car fender E. Sprich
Car frame C. A. Lindstrom et al
Car or barn door G. B. Murray
Car side bearing. Universal street J. E. Norwood
Car wheel grinding device P. F. McCormick
Cars, railway carriages, or the like. Bogie or
truck for tramway A. S. Nelson et al
Carbureter W. L. Severance
Carbureter H. B. Cornish
Carbureter F. Harmany
Carousel. Water A. Meffert
Cart cover S. Kurzman
Cartridge J. M. Edmunds
Cash register and indicator J. P. Emory
Casing head and tubing anchor J. C. Boyce
Casket holder G. Arpin
Casket holder G. F. Honold
Centrifugal apparatus A. Liedbeck
Centrifugal machine H. de Raasoff
Chain wrench. Double acting W. H. Downing
Cheese holder I. I. Eklund
Churn J. S. Lindquist
Cigar cutter W. M. Roberts
Cigarette machine G. M. Calberla
Cigarette or cigar holders, &c. Mold press for
making E. Simon
Cigarette paper with leaf metal. Apparatus
for coating G. M. Calberla
Clasp A. Person
Clasp O. J. Jones
Clock and money box. Coin controlled L. F. Kleeman
Clock case A. D. Blodgett
Clock. Electric F. Schmidt
Closure E. E. Chapman
Coal separator G. A. Kenner
Coin controlled apparatus M. Sielaff
Coin receiving, delivering, sorting, registering,
and detecting machine E. H. Spear et al
Coke oven door B. Troutman
Coloring apparatus. Yarn A. Fornander
Comb for applying liquid to the scalp J. B. O'Higgins
Combustion motor J. F. Bentz
Compressor J. Shipway
Concentrator and amalgamator. Combined H. J. Russell
Condiment holder. Composite L. B. Parker
Container joint W. L. Austin
Conveyer. Pneumatic M. J. Foyer
Cooker. Steam C. Cannom
Corkwood F. F. Lenhart
Corn husker C. G. Billings
Corn husking machine feeding device J. R. Hall
Corn shredder N. N. Windigstad
Cotton gin E. R. Barber
Cranes. Electric gear for O. Krammerer
Crematory F. E. Haycock et al
Curling iron case C. O. Sterling
Curtain and shade adjuster. Window H. P. Adams
Curtain support. Extensible E. W. Mathewson
Cutter heads. Instrument for determining the
position of cutters on molding J. Fay
Cycle mud guard J. Neinens et al
Dental appliance W. M. Dailey
Desk lock L. Moore
Desk. School J. F. Field
Developing apparatus. Daylight plate J. Lesperance
Disinfecting paper money. Apparatus for C. B. Clark
Ditching machine J. Page
Domestic heater C. A. Commiskey
Door. Air J. T. Deviese
Door check R. W. Hubbard
Door fastener. Portable R. F. Poenitz
Door hanger F. A. Burdett
Door hanger F. B. Cook
Door opening attachment E. F. Hicks
Donche. Nasal F. W. Moffitt
Draft connection L. Keding
Draft lightener B. H. Kellogg

Draft regulator. Automatic G. O. Lindgren
Dry kiln E. F. Rouse
Drilling machine H. Ballut
Drilling tool B. M. W. Hanson
Dust collector A. C. Brantingham
Dyeing, &c. Apparatus for F. Cleff
Ear drum protector J. A. R. Elliott
Elastic hand or strap J. D. O'Brien
Electric battery W. S. Bryan
Electric brake 2 pats. G. C. Anthon
Electric brake P. P. Crafts
Electric furnace R. C. Contardo
Electric light bulbs. Tool for removing or re-
placing incandescent A. T. Speelman
Electric light producing device H. Viertel
Electric motor T. W. Heermans
Electric time alarm T. L. Bear
Electrical accumulator C. P. Elieson et al
Electrical conductor W. H. Wherry
Electrical distribution system J. H. Hallberg
Electrical generation, distribution, and control
system L. Lyndon et al
Electrical generation, distribution, and control
system 2 pats. E. A. Sperry
Electrical generation, distribution, and control
system 2 pats. L. Lyndon
Electrical vibrations. Administering F. H. Brown
Elevator brake G. E. Carnes
End gate. Wagon E. A. Lampitt
Engine G. De Laval et al
Engine A. Russell
Engine starting device. Explosive J. W. Swan
Engine vaporizer. Gas W. W. Grant
Engines. Combined gas controller and igniter
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Envelop C. B. Denson
Evaporator E. R. Goings
Expansion bolt C. H. Haggerty
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Fan. Ventilating O. Giltner
Feed regulator and low water alarm. Auto-
matic water A. M. Masters
Felly joint holder W. J. Cranford
Fence post S. O. Campbell
Fence wire stretcher A. J. Chandler
Fertilizer and grain distributor R. Y. Kessler
Fertilizer distributor R. Love
Fertilizer distributor and seed drill J. P. Stevens
Fibrous material. Machine for compressing
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Fire escape C. J. Haggstrom
Fire extinguisher. Chemical A. C. Badger
Fire extinguishers. Sprinkler head for auto-
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Firearm. Revolving W. J. Whiting
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Fluid motor J. F. Bentz
Flux W. H. Wherry
Fowl carrier G. F. Bush
Fruit feeder I. H. Fay
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Furniture. Self-leveling 2 pats. G. W. & R. W. Bostwick
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Galley stand J. C. Kling
Game board W. E. Butler
Game. Race A. W. M. Keen
Garment suspender. Combination W. B. Tyler
Gas and oil engine B. Nusgrave
Gas generator. Acetylene L. Dietsch
Gas generator and burner. Oil R. Thayer
Gas light regulator S. W. Hyatt
Gas purifier safety dumping door E. F. Lloyd
Gear. Belt driving A. Bollee, Pere
Gear cutting machine J. Parker
Glass drawing machine G. H. Harvey
Glazed structure J. A. Payne
Glove F. W. Farrant
Glove R. B. McMasters
Gopher trap J. Morawetz
Governor. Engine O. Hove
Grain drill attachment. Double disk J. A. Bingham
Grain huller A. B. Couch
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Grinding machine D. Kennedy
Grinding mill A. J. Robinson
Hair pin A. Bowers
Hame W. H. Carr
Hammer. Power A. Groenig
Harrow H. J. Metz
Harrow tooth J. Schweinfurth
Harvester. Corn W. R. Page
Harvester twine holder and tension device F. A. Bicket
Hat holder M. N. Gable
Heat alarm H. F. Jones
Heating and sterilizing apparatus J. S. Forbes
Heating system F. C. Goff
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Hog tamer A. C. Decker
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Horseshoe calk C. L. Dahly
Hose pipe fastener F. Bissong
Hose supporter E. N. Humphrey
Household implement R. Gibbons
Hydrant W. Volkhardt
Incubator T. P. Adams
Index and advertising device C. F. West
Insect exterminator J. Schiller
Insulator L. Steinberger
Iron or steel. Electrometallurgy of H. Harmer
Jack R. H. Welles
Jar holder. Fruit K. A. Johnson
Joint coupling A. P. Brockway
Journal bearing H. Harding
Kiln H. M. Buck
Kitchen fork J. Proskauer
Lace fastener. Shoe G. C. Ferguson
Lacing hook mold P. Clifford
Lacing stud or eyelet J. L. Poalk
Ladder. Extension C. G. Tiefert
Ladder. Truck T. U. Sechler
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Ledger binder. Loose leaf L. M. Leslie
Lifting apparatus J. A. Taylor
Lifting jack L. C. Kimberly
Lifting mechanism T. L. F. Stack
Loading device A. E. Merkel
Lock C. E. Johnson
Lock and latch. Combined P. Schacht
Locomotive buffer beam J. F. Dunn
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Looms. Filling end holding means for auto-
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Lubricator L. Chapman
Lumber or lath handling apparatus W. A. Marshall
Magnet H. F. Campbell
Mail bag catcher A. P. Bower
Mail box. Rural C. F. Keller
Mailing or similar box indicator J. Booth
Massage implement J. Barker
Match or other box A. F. Fuller
Melting furnace J. F. Barker
Mercerizing apparatus T. Pratt
Metal, &c. Coin controlled device for emboss-
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Metal working machine traveling carrier S. B. Harding
Metals. Uniting two W. H. Wherry
Microscopist's paraffin bath F. A. Wunderlich
Milk can H. A. Keiner et al
Milk pail holder F. L. Shattuck
Molder's flask and gated pattern H. G. Voight
Molding apparatus vibrator F. W. Hall
Molding machine C. D. Marsh
Molten baths. Drawing articles from C. P. Byrnes
Monorailway and truck therefor L. Beecher
Mop wringer C. S. Fowler et al
Motive power. Generating A. Schutt
Motive power. Generation of A. Schutt
Mower. Motor lawn I. H. Davis
Music turner. Sheet M. T. Phillips
Nail or tack driving implement S. A. Cohen
Nest. Trap A. G. Root
Nut for safety bolt, air-valve caps, &c E. Michelin
Nut lock F. A. Howard
Nut lock T. G. Ingle
Nut lock H. C. Stouffer
Nut lock F. P. Koenig
Nut lock. Spindle S. C. Baughn, Jr
Nut or pipe wrench D. Stewart
Optical device M. F. Shea
Ore concentrator T. H. Hicks
Ore concentrator E. M. Jahraus
Ore separator. Pneumatic dry E. M. Jahraus
Package record retainer. Liquid T. Pendergast
Packing device for rotary motor stuffing boxes.
Adjustable S. George
Packing. Shaft G. E. Hibbard
Pail. Telescopic measuring C. Fisher
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Paper feeding machine C. B. Maxson
Paper feeding machine E. J. Hallberg
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for coating F. Maginn
Paste receptacle A. N. Ritz
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Pen. Fountain A. Eberstein
Pen. Fountain F. C. Brown
Pen. Fountain F. M. Kegrize
Pen. Fountain F. C. Brown
Petroleum engine B. H. Pomeroy
Photographic plate treating apparatus G. H. Dorr
Piano players. Adjusting device for cases of
automatic F. V. Crofut
Piano sounding board W. J. Brashears
Pianos. Device for automatically playing O. H. Arno
Pipe coupling P. E. Fisher
Pipe lining machine J. T. Langford
Pipe or nut wrench M. N. Sawyer
Pipe or spout holder J. V. Abronski
Planter. Automatic check row corn E. O. Storrs
Plow J. Naidn
Plow attachment T. Burkett et al
Pneumatic seat C. L. Berger
Pneumatic tired wheel T. Lindenberg
Pole. Wagon F. G. Winnek
Portable drill J. F. Willey
Potato digger H. Knipphals
Power transmitting mechanism E. A. Sperry
Preserving perishable substances. Apparatus
for C. Blagburn
Primer J. M. Edmunds
Printing and ruling machine ringed roller.
Lize G. F. McAdams
Printing machine W. Scott
Printing machine. Line G. F. McAdams
Printing machine. Warp G. H. Window et al
Printing plate holder C. F. Rockstroh
Printing press form inking rollers. Roller
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Printing press. Multicolor C. M. Shigley
Printing warps G. H. Winslow et al
Projectile K. Wieser
Propelling mechanism D. L. Graham
Propulsion apparatus for vessels. Jet S. George
Propulsion gearing W. B. Bard
Pulleys. Sectional hub for E. S. Hamilton
Pump C. J. Allen
Pump barrel clamp W. J. Bussinger
Pump governors. Pressure regulator for steam
 J. W. Gardner
Punch, pliers, &c. W. M. Morton
Punching machine O. P. Woodburn
Radiator connection J. S. Brennan
Rail bond terminals. Mold for casting W. H. Wherry
Rail bonds directly in place on the rails. Form-
ing electrical W. H. Wherry
Rail bonding apparatus W. R. Cleveland
Rail joint G. F. C. Powell
Rail joint S. S. Moore
Railway cattle guard A. R. Dawson
Railway crossing warning signal J. Crumley

Railway. Pleasure..... L. Beecher
 Railway rail and rail joint chair R. Urbanitzky
 Railway rail fastener..... R. D. Burchill
 Railway rail joint..... C. L. Pope
 Railway service safety device..... E. B. Powers
 Railway signal. Electric..... W. V. Moak
 Railway switch..... F. Bayless
 Railway trains. Apparatus for automatically
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 Rake..... M. Y. Warren
 Ringer..... A. M. Knudsen
 Road making machine..... I. Ogden
 Rope tie..... L. F. Ramsey
 Rubber dam holder..... A. J. Price
 Rudder..... T. P. Byram
 Safety guard..... G. O. Curtis
 Sample sheet..... J. Dohse
 Sash fastener..... J. Anderson
 Sash holder..... W. Lemke
 Saw handle. Crosscut..... W. MacLennan
 Saw table. Bracket..... J. C. Mallonee
 Scale. Depth..... W. J. Gillard
 Scraper. Dipper..... L. H. Johnson
 Sewing machine needle vibrating mechanism
 J. T. Hogan
 Shaft hanger..... C. W. Levalley
 Shaft. Vehicle..... E. Packer
 Shafting couplings. Apparatus for applying
 and removing..... W. J. Muncester
 Sharpening machine. Razor A. W. Scheuber
 Sharpening razors. Rotary wheel for C. Phillips
 Sheave. Ball bearing..... H. F. Keil
 Sheet metal articles. Machine for forming.....
 H. L. Bradley
 Shelf clamp. Glass..... W. H. Campbell
 Shelves. Label holder for library L. C. De Carli
 Shoe polisher..... M. A. Heiman
 Shoe upper fly closer..... S. Cloutier
 Shovel..... G. Thompson
 Signals over surfaces. Wireless electric trans-
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 Signaling apparatus. Electric..... 3 pats.
 W. E. Decrow
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 Silk. Making artificial..... E. Thiele
 Skate..... N. G. Johnson
 Skate sharpener..... C. W. Price
 Skid..... J. P. Frank
 Sled draft mechanism. Traction N. E. Brown
 Smoke consuming furnace..... J. A. Willard
 Smoke purifier..... J. F. Doyle
 Sound recording and reproducing machine.....
 H. Jones
 Spark arrester..... J. D. King
 Spiral motor. Steam and hydraulic S. George
 Split carrier..... F. C. Diniun, Jr
 Spring motor..... W. Weiner
 Square..... G. A. Stephens
 Stacker hood. Pneumatic..... I. A. Weaver
 Steam boiler..... E. U. Gibbs
 Steam boiler..... J. C. Stead
 Steamer. Clothes..... J. A. Owens
 Still. Water..... G. A. & C. A. Young
 Stove..... A. B. Fox
 Stove. Portable camp..... W. Weston
 Streams. Means for controlling flowing.....
 E. S. Cole
 Street light..... D. J. Prendergast et al
 Stopping machine. 2 pats..... A. W. Scheuber
 Stud and pin coupling..... A. B. Tarbox
 Surgical instrument case..... F. A. Koch
 Suspenders..... H. G. Macwilliam
 Swinging gate..... E. & W. B. Browning
 Syringe. Vaginal..... F. J. Gruss
 Tank mold..... M. Lee
 Telegraph instrument stand..... J. W. Leech
 Telegraphy. Spark..... A. Slaby et al
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 U. S. Jackson
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 Telephone switching and signaling apparatus.....
 M. C. Rorty
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 A. W. Nilsson
 Tire. Multiple tube pneumatic..... H. G. Fiske
 Tire protective band. Pneumatic..... H. Brookes
 Tire protector. Vehicle..... F. B. Hayden
 Toe swage..... D. C. Joy
 Toilet stand..... J. C. Dowd
 Tool. Combination..... J. Jenkins
 Tool turret mechanism..... B. M. W. Hanson
 Top. Movable..... S. Cloutier
 Torpedo placer. Railway..... F. G. Shimp et al
 Tower. Rotary pleasure..... W. R. Snyder
 Toy..... J. C. Wells
 Trace hook..... B. T. Kinnear
 Track leveler..... J. Finn
 Transformer..... A. R. Everest
 Trolley attachment. Overhead C. Holyland, Sr
 Trolley for electric railway cars..... C. I. Johnson
 Trolley pole..... J. J. Tartt
 Truck and hoist. Barrel..... E. B. Little
 Truck bolster and bearing therefor. Car.....
 E. Cliff
 Truck bolster. Railway car..... C. F. Street
 Trunk fastener..... B. Weber
 Turbine. Steam or gas..... J. Stumpf
 Type writer..... A. Beyerlen
 Type writing machine..... C. Gabrielson
 Type writing machine..... C. H. Shepard
 Type writing machine keyboard..... A. Beyerlen
 Type writing machine tabulating device.....
 A. P. Beyerlen
 Umbrella..... E. T. Miller
 Umbrella..... A. Fieldhouse
 Upholstering device..... H. B. Pitner
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 Valve..... W. H. Thompson
 Valve. Flushing..... R. F. Gillin
 Valve gear. Explosive engine..... R. E. Olds
 Valve. Steam actuated..... R. D. Ackley
 Valve. Steam actuated..... E. W. Penfold
 Valve. Steam engine piston..... W. Schmidt
 Vapor burner..... F. E. & F. O. Stanley
 Vapor engine..... B. H. Pomeroy
 Varnish substitutes. Manufacturing R. Blume
 Vehicle alarm. Road..... N. M. Goculdas et al
 Vehicle body..... R. F. Monroe
 Vehicle brake..... W. H. Cooley
 Vehicle brake..... A. M. Ledbetter
 Vehicle. Convertible..... H. Romunder
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 A. P. Brush
 Vehicle top valance..... C. S. Applas
 Vending machine..... J. J. Sleeper
 Vending machine..... C. V. Wertz
 Vessel with charging or discharging means.
 Rotary..... A. Wunsch
 Vibratory treatment. Implement for mechan-
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Vibratory drier..... M. E. Cooley
 Wagon. Dumping..... D. S. Everett
 Washing machine..... E. V. Allen
 Watch holder..... G. R. H. Thorn
 Watch winding and setting mechanism.....
 A. Ditesheim
 Water gage..... N. H. Hiller
 Water purification..... C. Monjeau
 Water tube boiler..... T. W. Johnson
 Water wheel setting..... A. Giesler
 Weather strip..... S. Lenzner
 Weighing machine. Can..... W. H. Coffelt
 Well working barrel..... W. W. Sleeman
 Wells. Fishing tool for oil or like C. A. Sargent
 Wind wheel..... A. M. Cox
 Window screen..... C. D. Cutts
 Wire. Covering..... J. C. Anderson
 Wire stretcher..... D. M. Fry
 Wire stretcher..... I. M. Warner
 Wire working tool..... B. B. Feltus
 Wood scraping and smoothing machine.....
 N. J. Mathiesen
 Wrench..... M. M. Le May
 Yoke. Neck..... A. H. Engeljohn et al

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Badge..... P. H. Englewood
 Bank. Money..... J. B. Weir et al
 Brooch, button or buckle plate, or similar ar-
 ticle..... S. A. Keller
 Brushes, mirrors, or similar articles. Back for.....
 H. J. Straker
 Cabinet. Kitchen..... C. A. Post
 Collar..... 4 pats..... F. Edelmann
 Finger ring..... H. S. Dana
 Harmonica. Mouth..... H. Hohner
 Liquid container..... O. Krause
 Spoons, forks, or similar articles. Handle for.....
 J. H. Hobson
 Standard for lights, clocks, &c E. L. Brinard
 Tiling..... A. A. Spadone

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 Aerating liquids or charging them with gas.
 Apparatus for..... W. Hucks, Jr
 Agglomerating compound for agglomerating
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 Angle strip..... L. Gidley
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 Apparel pad..... E. L. Krait et al
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 Awl. Sewing..... T. O'Shaughnessy
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 T. J. Lindsay
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 Ball valve and connected parts. Foot.....
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 E. Layton
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 Band fastening..... H. H. Beckman
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 Battery plate. Storage..... J. Bijur
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 D. W. Anderson
 Brick or tile cutting machine cleaner.....
 W. J. Eipp
 Brick truck..... W. L. Harbin
 Bridle..... H. H. Poe
 Broom bridle..... J. B. Ryan
 Bucket elevator and conveyor..... F. V. Hetzel
 Buckle..... H. L. Perryman
 Buggy boot spring..... G. T. Wilson
 Button..... D. P. Katz
 Buttonhole stitching machine..... E. B. Allen
 Cable hanger..... R. H. Villard et al
 Calculating machine..... F. C. Rinsche
 Cameras. Photographic lens for..... F. Stark
 Can catcher..... H. P. Hinckley
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 Carriage rocker attachment. Baby O. M. Pond
 Carton machine..... C. A. Coombs
 Casein. Preparing food..... A. A. Dunham
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 Caster. Furniture..... J. Bornemann
 Caster. Furniture..... J. W. Kennedy
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 Centering support..... G. H. Kunneke
 Centrifugal separator..... P. L. Kimball
 Chair wardrobe attachment..... H. A. Dodge
 Chairs. Rubber and metal cap tip for.....
 S. Garrett
 Checks. Detachable cover for bank.....
 E. C. Deans
 Chisel..... F. E. Norton
 Chock block. Adjustable..... J. P. Abernathy
 Chuck. Drill..... W. H. Saunders
 Chuck. Rock drilling machine..... L. Leigh, Jr
 Churn..... W. G. Radcliffe
 Churn..... H. A. Bierley
 Clarinet of Boehm..... E. Bercieux
 Cloisonne ware. Manufacturing..... T. Pfister
 Cloth take up and stretching device.....
 C. E. Meding
 Clothes drier..... C. C. Crossley
 Clutch. Friction..... J. H. B. Bryan
 Clutch mechanism..... W. W. Sweetland
 Coat..... C. Austern
 Cock. Gage..... W. L. Morris
 Cock. Safety gas..... M. R. Daley
 Coil structure. Field..... C. H. Kaler
 Coin changer..... C. C. Jackson
 Coin controlled apparatus..... H. H. Cummings
 Coin controlled apparatus..... T. F. Solon
 Coin counting, registering, and wrapping ma-
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 Collar. Horse..... J. V. Stone
 Collar stretching apparatus..... A. Sharp
 Concentrator..... H. Wismeyer
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 Condensing vaporous fluid. Apparatus for.....
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 Controller casing..... C. L. Perry
 Conveyor. Bucket..... C. H. Nutter
 Cooker. Steam..... W. J. Kennedy
 Cooking articles of irregular outline. Wrapper
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 Copy holder..... J. W. McCaun
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 C. G. W. Wernicke
 Corset busk..... V. Bovy
 Cot and pack bag. Combined convertible.....
 S. D. Martin
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 Cows. Shackle and tail holder for.....
 L. G. Macauley
 Crib. Child's..... J. Campbell
 Culm bar..... J. S. Wilson
 Cultivator..... A. Lindgren
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 Discount meter. Demand..... F. P. Cox
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 Display device..... J. Russ
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 Drawers supporter..... H. W. Post
 Drawing instrument..... F. H. Wheelan
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 Drilled holes. Tool for cleaning..... F. W. Brady
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 Dust spraying machine..... J. R. Haldeman
 Dyeing apparatus. Game ball..... A. L. Burt
 Dyeing machine. Yarn..... R. Elliott
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 E. Thomson
 Electric blanket..... F. K. Singer
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 E. M. Hewlett
 Electric controller..... F. E. Case
 Electric cut out..... W. H. Verner
 Electric light fixture..... J. J. Miller
 Electric motor..... H. P. Maxim
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 Electric switch..... G. Mouson
 Electric switch..... E. A. Lowe
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 Electric vacuum discharge tube M. Krouchkoll
 Electrical controller and brake operating de-
 vice..... W. W. Rice
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 Elevator bucket..... W. G. Avery
 Elevator cam..... W. Humphreys
 Elevator safety catch..... H. F. McDonald
 Elevator safety device..... J. Nemeche
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 Engine cooling means. Explosive..... H. Nelson
 Engine exhaust. Explosive..... A. A. Low
 Engine mixer. Gasoline..... J. M. Johanson
 Envelop..... C. G. Throop
 Equalizer. Four horse..... P. N. Petersen
 Extension table..... T. C. Thompson
 Eyeglass case..... C. J. Wilson
 Eyeglass nose piece..... C. F. Wall
 Eyeglass or spectacle attachment.....
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 Fan..... W. J. Smith
 Fan deflector..... N. Morgan
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 C. Kremer
 Feed or litter carrier..... L. C. Smith
 Fence weaving machine. Wire..... J. J. Foss
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Fodder preparatory to compressing same. Apparatus for treating.....M. K. Westcott
Folding box or crate.....C. H. Russell
Forceps. Obstetrical.....H. E. Koch
Form. Garment.....J. Walker
Framing or other purposes. Stock for.....J. H. Killion
Fruit elevator.....C. D. Nelson
Fruit or vegetable cutter.....S. D. Smithwick
Fuel block and producing same. Artificial.....M. W. Cottle
Fuel tank. Liquid.....F. T. Cable et al
Furnace discharging device.....C. I. Dailey
Furnaces. Automatic draft regulator and smoke preventer for.....A. H. Thayer
Furniture support. Self leveling.....E. E. Seacrist
Gage.....J. W. Melvin
Game apparatus.....W. H. & A. H. Dennis
Garment fastener.....W. S. Richardson
Garment supporter.....R. A. Perlie
Gas burner.....H. W. Webb
Gas burner.....C. V. Hill
Gas burner. Incandescent.....V. A. Rettich
Gas machine blower.....C. E. & J. W. Sayre
Gear. Friction.....S. C. Spangler
Gear. Reversing.....R. A. Maples
Gear. Reversing.....J. C. Entriken
Gearing.....G. Westinghouse
Generator speed regulator.....G. J. & H. G. Peistring
Gill boxes. Automatic safety stop motion for.....D. Stockwell
Glass cutting apparatus.....W. Pannkoke
Go-cart. Folding.....G. H. Barschow
Gold saving. Grading, classifying, and distributing auriferous wash in.....A. G. Kidston-Hunter
Grain elevator.....C. S. Upham
Grain grading and separating machine.....F. S. & C. T. Snively
Gravity. Apparatus for ascertaining the acceleration due to.....P. G. W. Keller
Gravity lock.....P. V. Simmonds
Grinder. Feed.....J. A. Engel
Grinding attachment. Compound.....T. B. Stephenson
Gun carriage or mounting.....G. Ehrhardt
Gun recoil spring apparatus.....H. Schroder
Guns. Fluid brake for.....A. Resow et al
Hammer. Power.....A. A. Koch
Hammock.....R. C. Furst
Hand wheel.....E. H. Metcalf
Hanger box.....M. H. Dette
Harness.....B. F. Baker
Harrow.....S. H. Wooster
Hat pin and attachment.....F. Ashton
Hay rake and tedder.....P. von Del Negro
Heater.....P. J. W. Hoaglund
Heating apparatus.....S. F. Shafer
Heating devices. Apparatus for the regulation of electrical circuits in.....W. D. Kilroy
Heel. Elastic.....F. H. Stubner
Hinge.....A. H. Christie
Hinge. Gate.....J. Leffler
Hoisting mechanism.....P. Mullen
Hook and eye. Safety pin.....E. A. Campbell
Horsehoe.....A. D. Gosett
Hose coupling.....J. Gluck
Hydraulic separator. Pneumatic.....F. W. Hopkins
Hydrocarbon burner.....G. N. Wolf
Induction coil.....C. E. Splittorf
Ink tablet. Effervescent.....W. C. Pope
Insulation. Underground conduit.....J. M. Humiston
Insulator.....P. S. Lindal
Insulator.....J. M. Mahoney
Insulator. Electric.....T. T. Lyman
Insulator. Line.....C. C. Chesney
Insulator pin.....J. H. Bullard
Jar closure.....W. W. Cadle
Jar closure.....W. E. Brown
Journal bearing for truck wheels and casters.....G. P. Clark
Journals of locomotive driving wheels. Device for truing.....H. F. Scatchard et al
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Key ring and tool. Combined.....C. P. Wing
Keyboard instruments. Device for sounding chords on.....S. Macey
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Knitting machine stop motion.....G. W. Ruth
Lacing. Shoe.....M. M. Heinitsh et al
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Lathe speed change mechanism.....W. D. Snider
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Lighting arrester.....C. C. Chesney
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Mail box.....J. V. Keener
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Mailer. Coin.....C. H. Stempel
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Measuring and truing shoe tips. Device for.....G. Elmasian
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Mechanical movement.....H. F. Brammer

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Molding press, mold die, and vulcanizer. Combined.....R. H. Smith
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Mortar mixer.....R. Bodlaender
Motor.....R. W. Funk
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Motor fluid generator.....R. Berg
Motor fluids. Generating.....R. Berg
Motors. Means for controlling governor.....G. Wright
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Multiple expansion engine.....3 pats.....F. M. Prescott
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Music roll and spool. Adjustable and self-adjusting.....M. Gally
Musical instrument.....E. S. Stevenson
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Musical instrument automatic playing attachment.....W. H. Rees
Nail puller.....W. T. Norcott
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Oil burner. Crude.....G. W. Bedinger et al
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Ordnance. Breech loading.....V. C. Tasher
Ordnance firing pins. Retracting attachment for.....G. Gerdorn
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Piston rings from outside the cylinders. Device for adjusting.....P. Bode
Piston rod cooling device.....T. Matson
Piston travel regulator.....J. T. Fite
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Planter attachment.....R. A. Patterson
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Plow.....E. G. Henry
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Press.....E. Pilliod
Pressing board.....A. McKenzie
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Printing by means of elastic rollers or plates.....E. Schoening
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Railway spike lock.....E. C. Winters
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Rheostat.....G. Graybill et al
Rivet, bolt, &c. Expansion.....J. M. Dodge
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Road crossing device.....F. L. Sessions
Robe. Folding cart.....L. A. W. Bird
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Rotary engine.....F. J. Waters
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Rug adjuster. Reversible.....J. L. Kingston
Sad iron and radiating stove. Combined.....H. Green
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Screw threading and welding thread protectors &c.....G. W. La Voo
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Seed huller.....F. A. Wells
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Sewing machine needle threading attachment.....L. Bernard
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Shade, curtain, and cornice supporter. Combined window.....G. Mullory
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Spoke tightener.....C. F. Lindsay et al
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Stamps, tickets, or the like. Mechanism for dispensing.....M. Sielaff
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Staple setting machine.....A. D. Thomas
Station indicator and advertising device.....L. Casper
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Steam generator.....S. M. Cockburn
Steam trap.....R. Warriner
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Stocking stretcher.....O. J. Katz
Stocking top cutting machine.....F. W. Robinson
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Teeth bases. Strengtheners for vulcanite artificial.....R. Walker
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Telephone switchboard ringing key.....F. R. McBerty
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Tent for shading tobacco or the like.....C. M. Berry et al
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Window. Metal.....J. A. Kuisely
Wire loom.....I. J. Neracher
Wood. Preserving.....G. W. Gordon
Wrench.....F. A. Drury
Wrench.....P. Toohey
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Box.....W. G. Booth
Clock case and support.....C. A. Warner
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Decanter.....L. Blower
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 Burglar alarm.....J. A. Minturn
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 Canopy support.....J. O. Gage
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 Chair brace.....R. E. Mock
 Chamber vessels. Cover for earthen W. C. Miles
 Check, spreader, and pilot light device. Combination.....M. D. Compton
 Chocolate cooling mechanism.....E. W. Mull
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 Circuit breaker. Automatic.....E. M. Hewlett
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 Clothes drier.....C. W. Gies
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 Evaporating liquids.....B. F. B. Sewell
 Evener. Three horse.....S. A. Massey
 Expansion trap.....E. H. Gold
 Explosion motor.....F. Baltzinger
 Eyeglass mounting.....H. Caswell
 Eyeglasses.....E. Beckwith
 Fan blade.....W. O. Webber
 Fastening device.....H. E. Berkey
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 Filter bed cleaning apparatus. Sand.....H. W. Blaisdell
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 Fire escape.....A. S. Bacon
 Fire escapes. Counterbalancing stair or ladder for.....P. L. Larson
 Fire extinguisher. Chemical.....W. C. Hickox
 Fire extinguisher. Chemical.....A. J. Knight
 Fire extinguishing device.....C. Brown
 Fire starting device.....J. A. George et al
 Fireman's helmet.....C. T. Thompson
 Fish basket covers. Device for automatically closing the orifices in.....W. A. Sinclair
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 Fishing tackle.....O. Miller et al
 Flooring or wall covering material.....J. J. C. & M. Smith
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 Fluid pressure brake.....E. M. Herr
 Fluid pressure jack.....R. A. Christensen
 Fluid pressure motor.....J. P. Lajoie
 Foot warmer.....J. D. Carney
 Forging suspender.....E. F. Galloway, Jr
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 Furring. Wall.....C. E. Dobbin
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 Garment hook.....E. V. Lake
 Gas generator. Acetylene.....A. C. Einstein
 Gas generator. Acetylene.....A. Davis et al
 Gas lighting attachment.....P. Bardot
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 Gas or solid fuel furnace.....R. A. May
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 Gate.....I. L. Landis
 Gate fastener.....G. S. Francis et al
 Gearing. Interchangeably locked.....W. H. & R. Thompson
 Gearing. Relief mechanism for machinery.....C. G. Tideman
 Glass blowing and finishing machine J. Schies
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 Heater.....W. Stewart et al
 Heating articles by electricity.....E. F. Price
 Heating articles. Electrically.....E. F. Price
 Heel.....E. D. Tyler
 Heel building machine.....W. P. Bosworth et al
 Hinge and automatic catch for awning blinds.....F. W. Lutts
 Hoisting and conveying device.....J. G. Delaney
 Hoists. Rope system for coal bridge.....G. E. Titcomb
 Holdback hook.....H. Breiding
 Hood and cooking utensil. Combined.....W. H. Zimmerman
 Hoop flaring and sizing machine.....C. Grotnes
 Horn.....W. Gebert
 Horse shocking device. Electrical J. A. Giles
 Horseshoe.....N. C. Miller
 Horseshoe.....C. W. Voskamp
 Horseshoe nails. Machine for the manufacture of.....E. E. Pierce et al
 Horseshoe pad.....J. F. Robinson
 Hose coupling.....L. V. Long
 Hose supporter.....A. H. Cohn
 Hydraulic arresting device.....O. H. Ensign
 Hydraulic engine and pump.....C. H. Pagett
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 Hydrocarbon burner. Crude.....A. C. Rush
 Hydrocarbon burning apparatus.....W. N. Best
 Hydrocarbon vapor burner.....W. S. Proskey
 Ice making apparatus.....H. Stout
 Identification. Method of.....F. H. De Pue
 Illuminating structure. Prismatic.....F. L. O. Wadsworth
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 Inclosing device.....A. G. Eneas
 Incubator heating apparatus.....M. M. Johnson
 Incubators or hothouses. Automatic signaling apparatus for.....H. B. Ault
 Inking device.....H. A. Davis
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 Internal combustion motor.....A. Vogt
 Invalid lifting apparatus.....B. Bratlie
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Continued in April Number.

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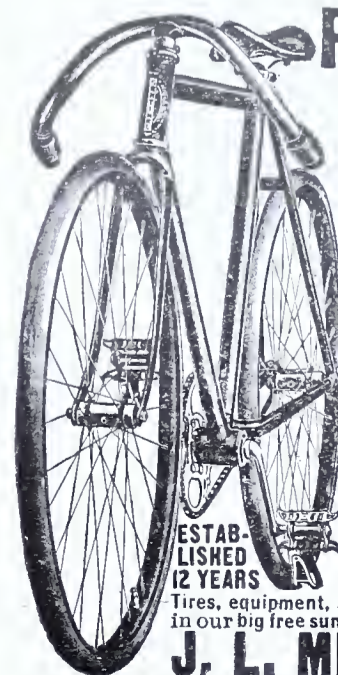
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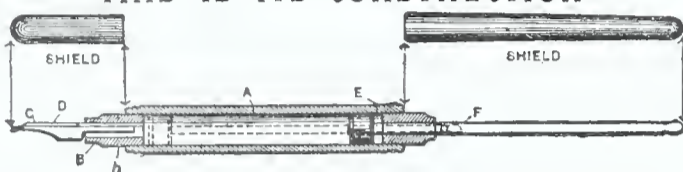
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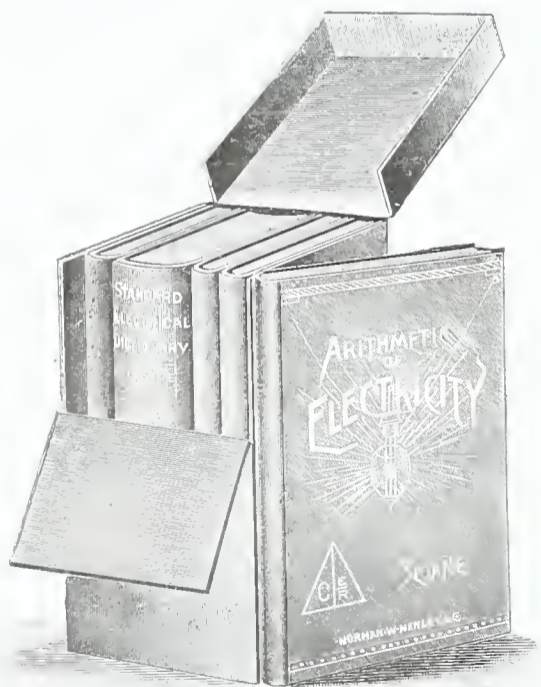
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SIXTEENTH YEAR,
No. 4.

WASHINGTON, D. C.---APRIL, 1904.

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EXTRACTING FIBRE FROM FIBRE-BEARING PLANTS.

FIBRE-BEARING PLANTS flourish in many parts of the world, such as India, Africa, New Zealand, Mauritius, Mexico, Bahama Islands, and New Guinea; but Mexico stands first in the list of countries exporting fibres. The textile resources of Mexico are vast, its fibre-bearing producing plants flourishing in spontaneous profusion. The natural growth of Ixtle Lechuguilla, Ixtle de Palma, Ixtle Maguey and Pita is sometimes so dense that planters can not cross their lands without cutting roads. The crude hand methods of extracting the fibre yield relatively small results. The largest amount produced by hand

influence except moisture. When rain falls on the plant, this outer covering softens, permitting the leaf to absorb the water, and with the action of the sun and wind it hardens again, retaining the moisture within the leaf.

The plant is of a pale green color, and grows to the height of 18 to 36 inches. It has a number of concave leaves, each one opening from the ground and ending in a sharp point, almost a thorn. It is very thrifty, and propagating from the seed, soon covers the entire area, of any tract of land where it is once started.

The early history of the use of this plant is very little known, except that so



GATHERED LEAVES READY FOR MACHINE.



FIBRE BEING DISCHARGED FROM MACHINE.

work only averages fifteen pounds of fibre per day. Such slow and ineffective methods can neither satisfy the demands of commerce, nor develop the textile riches of Mexico and other fibre-bearing countries.

The principal one of the plants producing the textile fibres is the Lechuguilla. It is of the great Agave family, akin to the Maguey and the Hennequin of Yucatan. The plant grows in a dry climate, and thrives even in the sandiest and otherwise most barren sections of the northern part of the Mexican Republic. It is almost an air plant, seeming to take very little nourishment from the soil, and retaining the moisture that falls on it for an indefinite time. The outer covering of the leaf is of a pasty substance which is impervious to any

far as the history of the Republic dates back, it has been a merchantable commodity, being used almost entirely for making the ore bags used in mining, in carrying charcoal, and for making ropes, and brushes. The natives use it for purposes of washing, as the green fibre, while it yet contains some of the pulp, is a most excellent soap both for laundry and toilet purposes.

It is affirmed that remains of bodies have been found in caves wrapped in mantles woven from this fibre, and that bundles of arrows were found bound together with cords woven from the Lechuguilla. Whether or not these stories be true, actual experience has taught that this fibre is very strong and durable, especially in water. Bags made from it have been used in and around mines

for eight or ten years without being destroyed. Tests made have determined that its tensile strength is only about half that of hemp when used alone in rope-making, but that is because of the peculiar shape of the fibre at the end of the leaf next the ground, it being slightly larger at that end than the other, and for this reason, when woven into a rope, it slips apart, but does not break. The strength of the individual or single fibre of Ixtle is greater than that of the single strand of hemp.

In gathering the plant for the purpose of extracting the fibre, only the central stalk is cut. This stalk is the greenest and freshest part of the plant, consisting of eight or ten new leaves closely rolled together, and gives both the great-

chain runs and holds them. The fibre or cleaned ends are then combed out straight over a middle or transfer drum, around which the transfer chain returns.

The leaf is transferred across the middle drum by a small endless steel cable and delivered to another face plate, around the edge of which are grooves in which run steel endless cables, which hold the half cleaned leaf by the cleaned or (fiber end) and transfer it down to a point where another face plate with scrapers attached, clean one side of the running end downward against a stationary face plate underneath; and after passing the center of this face plate, the remaining one-fourth of the pulp remaining on the uncleaned edge is scraped by the knives, turning up or reversing the ends of the leaf upward and scraping it against the side of the face plate, around which the cables work, and the cleaned fibres come out on a continuous sheet over a third or discharge drum, over which the endless cable returns back to middle drum. The pulp is discharged directly underneath on the ground, the underside of the machine being entirely open.

The defiberator is portable and is especially designed to treat the leaf in the field where it grows to save expense of handling the heavy green leaves, and the friction being very small, a light portable ten-horse power machine runs it nicely: in fact, an ordinary traction engine is just suitable for it. The refuse from the machine is used as fuel for the engine and boiler.

The green fibre, on emerging from the machine, is carried to a cleared space a short distance away and spread in thin layers on the ground to dry. The product of one day's work is ready for baling and shipping on the following day, as it dries very rapidly. It is compressed into bales of 500 pounds each. The labor required for the operation of one of these machines is usually twenty-five men, nearly all of whom receive fifty to sixty cents a day. The machine is placed with the operator on the basis of a royalty to the owners of the patents, who are also manufacturers of the machines.

The principal market for the product is New York. Though it is a comparatively new article, the report of the Custom House shows that there has been an increase of about 70 per cent. in the amount exported from Mexico in the last three years.



THE BEARD-HAYNE DEFIBERATOR.

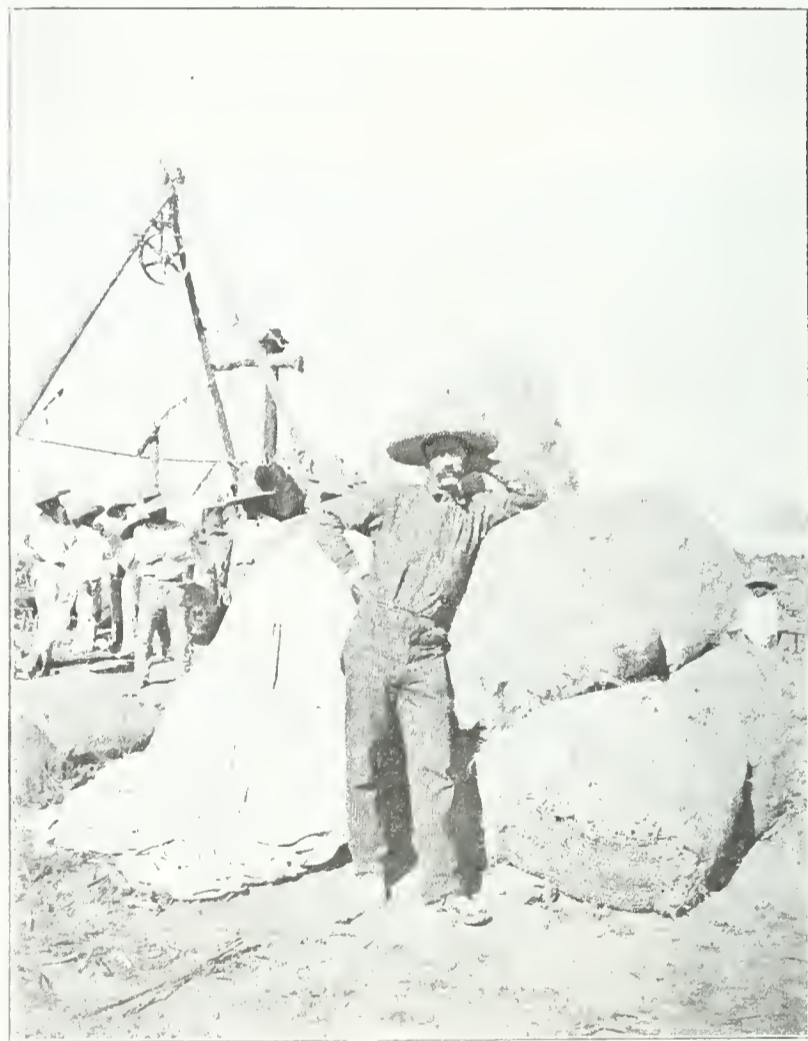
est quantity and best grade of fibre. The cutting of the stalk serves to perpetuate the life of the parent plant, as so long as the stalk is cut, the plant continues to grow: but when the stalk is not cut for a period of five years, it grows into a tall, all-wood stem of three or four feet in height. Flowers die, and the parent plant dies with it. The more carefully the plant is looked after, and the stalk cut out, the larger each succeeding stalk and the finer the quality of the fibre. The stalks are cut by natives and bound in bundles of convenient size for handling. One man can cut twenty-five bundles in a working day of ten hours. Each of these bundles will give about two pounds of fibre. The outer leaves of the plant are much harder and more woody than the centre stalk, and are not used for fibre.

These bundles are carried or hauled to the machine, if the work of extracting the fibre is done by machine, and if not, when the cutter has a sufficient stock of stalks on hand he extracts the fibre by hand. The average amount extracted by hand per day is fifteen pounds.

The real difficulty in making use of this and kindred plants, has been the lack of a machine which would extract the fibre satisfactorily and in such quantity as to render the use of a machine profitable. A number of machines have been invented, and fortunes spent in experimenting without results. The machine that produces the desired result is the Beard-Hayne Fibre Extracting Machine.

This is a snug, compact, mechanical combination of revolving face plates, which hold, transfer and deliberate any and all kinds and species of succulent leaf containing fibres: also dry leaves, if first moistened. It is entirely automatic and self-contained, producing at and by one operation a finished commercial product of fibre from a natural leaf being fed into the defiberator.

The leaf or bunch of leaves being brought to the machine, tied in suitable sized bundles, are untied on a feed table and fed in a continuous stream over a front or feed drum on a chain and under the edge of a revolving face plate: the leaf being held at one end by the chain in a groove in the edge of the face plate, which revolving slowly, transfers the stream of leaves down to a point just below the center of the face plate, where a second face, moving in an opposite direction and at high speed, and having six dull knives or scrapers butted to the face, clean one side of one end of the leaf downward against a stationary face plate, and after the leaves pass the center of the face plate, the scrapers or knives catch them upward, and thus reversing the side of the leaves and so cleaning the opposite unclean side of the leaves by scraping upwards and against the side of the revolving face plate, over or around which the transfer



FIBRE Baled READY FOR SHIPMENT.

The Beard-Hayne defiberator is now in successful operation in the plantation owned by William Richardson, Carmen Station, Mexico. Three machines have been running for two years, and the yearly output is 300,000 pounds of fibre for each machine. When the machines are once placed on a plantation they are permanent, as the supply of the plant is inexhaustible.

The high cost of manilla and other soft fibres, also cotton, has compelled rope and twine manufacturers to mix in a hard fibre with ropes and twines, and this they have been able to do successfully by reason of the fibre obtained from the Ixtle Lechuguilla. It does not rot when put under water and has great strength. So successful has been the introduction of the Beard-Hayne defiberator that the product of the machines already in use has been sold under contracts months ahead of its production.

A company has been formed and its main office is 711 Lucas Avenue, St. Louis, Mo. No stock in the company is being offered for sale, but the machines may be either purchased or leased.

IMPORTANT COURT DECISIONS.

DECISIONS OF THE U. S. COURTS.

Supreme Court of the United States.

UNITED STATES, *ex rel* STEINMETZ, *v.* ALLEN, COMMISSIONER OF PATENTS.

Decided February 23, 1904.

1. MANDAMUS TO COMMISSIONER OF PATENTS—APPEAL TO EXAMINERS-IN-CHIEF—DIVISION OF APPLICATION

Where the Commissioner of Patents refused to direct the Primary Examiner to forward to the Examiners-in-Chief an appeal from his ruling that process and apparatus claims should be divided and presented separately, *Held* that a mandamus will lie to compel him to forward the appeal.

2. APPEAL TO EXAMINERS-IN-CHIEF—APPEAL REGULAR IN FORM—DUTY OF EXAMINER.

Where an appeal is filed regular in form, it is the duty of the examiner to answer the appeal by furnishing the Examiners-in-Chief the statement provided for in Rule 135.

3. SAME—REQUIREMENT TO DIVIDE APPLICATION—MERITS DISTINGUISHED.

Held that a requirement by the Primary Examiner for division is appealable to the Examiners-in-Chief, although a distinction can be made between his ruling upon that question and one on the merits, if we regard the merits to mean invention, novelty, or the like.

4. SAME—REQUIREMENT FOR DIVISION IS REJECTION.

Where the unity of the inventions claimed by the petitioner is not denied, he has the right to join them in one application, and where the Primary Examiner in such case denies that right *Held* that the Examiner's action is a rejection of the application and entitles petitioner to an appeal to the Examiners-in-Chief under section 4909, Revised Statutes.

5. SAME—APPEALABLE RULING—FINAL ACTION.

Where the ruling is such that the applicant must yield and give up the right claimed, or if he does not yield he will not be heard at all and may subsequently be regarded as having abandoned his application, *Held* that such ruling must be considered as final and appealable.

6. RULE 41 INVALID—DIVISION BETWEEN PROCESS AND APPARATUS.

The provision in Rule 41 of the Rules of Practice of the Patent Office which compels the separation of claims for a process and claims for its apparatus is invalid because it precludes the exercise of any judgment, however related or connected they may be.

7. STATUTORY RIGHT TO JOIN INVENTIONS—RELATED INVENTIONS.

The statute gives the right to join inventions in one application in cases where the inventions are related, and it cannot be denied by a hard and fixed rule which prevents such joinder in all cases.

8. PROCESS AND APPARATUS MAY BE RELATED.

Process and apparatus may be related and may approach each other so nearly that it will be difficult to distinguish the process from the function of the apparatus.

9. DIVISION OF APPLICATION—DISCRETION OF PATENT OFFICE—REVIEW BY COURTS.

Without a hard and fixed rule the action of the Patent Office upon the question of dividing applications for patents can be accommodated to the character of invention, and discretion can be exercised, and when exercised

the courts will not review it except in cases of clear abuse.

10. WRIT OF ERROR—JURISDICTION—VALIDITY OF AUTHORITY UNDER UNITED STATES RULES OF PATENT OFFICE.

Where the Commissioner with the approval of the Secretary of the Interior and acting under the authority of the statute makes a rule of procedure and that rule constitutes in part the powers of the Primary Examiner and Commissioner in the action complained of and the plaintiff assails the validity of that rule, *Held* that there is drawn in question the validity of an authority exercised under the United States and that the Supreme Court has jurisdiction to review the judgment of the court of appeals by writ of error.

Court of Appeals of the District of Columbia

IN RE BUTTERFIELD,

Decided January 4, 1904.

1. INVENTION—ANTICIPATION—RUBBER SOLED SHOE.

Where it was old to vulcanize a rubber sole to the outer leather sole of a shoe and was old to vulcanize a rubber sole to the inner sole, *Held* that there was no invention to vulcanize a rubber sole directly to an inner sole of a particular kind provided with a welt.

2. SAME—SAME—MECHANICAL SKILL.

Where a prior patent shows a rubber sole vulcanized to the inner sole with an interposed layer of rubber-coated cloth, *Held* that the omission of the cloth does not involve invention, but mere mechanical skill.

Court of Appeals of the District of Columbia.

WATSON *v* THOMAS.

Decided January 5, 1904.

1. INTERFERENCE—PRIORITY OF INVENTION.

Held that Watson was the first to conceive the invention and the last to reduce to practice and that he has not shown that he was exercising diligence. The decision of the Commissioner of Patents awarding priority of invention to Thomas affirmed.

2. SAME—SAME—LACK OF DILIGENCE.

Where the inventor who was first to conceive the invention produces no evidence whatever of any action on his part to reduce the invention to practice beyond the making of some working drawings and a blue-print from them, *Held* that these acts cannot be held to be a manifestation of due diligence.

3. SAME—SAME—SAME—UNCERTAINTY AS TO DATES.

Where the burden is upon a party to show diligence between his conception and reduction to practice and his proofs leave it in doubt whether the alleged steps taken by him were before or after his opponent entered the field, *Held* that he has not proved diligence, and the decision must be against him.

COMMISSIONER'S DECISION.

EX PARTE PAYNE.

Decided December 3, 1903.

1. EXAMINATION PRACTICE—PERPETUAL MOTION—CITATION OF REFERENCES.

Where claim is made to a perpetual motion machine, *Held* that the Examiner may properly reject the claim on the ground of inoperativeness without making a search through and citing the prior art.

2. SAME—SAME—SAME—NOT NECESSARY TO MAKE SEARCH.

As an ordinary rule all reasons for rejection should be given; but an exception may be made properly where

the alleged invention is based on principles in direct conflict with the fundamental laws of science and mechanics.

3. SAME—SAME—SAME—INOPERATIVENESS.

The objection of inoperativeness on the ground that the machine is a perpetual motion machine does not stand upon the same footing as an objection of inoperativeness based upon some mechanical defect in the device.

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In choosing a subject for the lectures, it seemed to the author that a consideration of the bearing of recent work on this relationship might be suitable, especially as such a discussion suggests multitudes of questions which would furnish admirable subjects for further investigation by others. The book is fully illustrated, and embraces all lectures given by Doctor Thompson during the year.

The book is from the press of Charles Scribner's Sons, New York, N. Y.

Canadian Corundum.

Corundum, otherwise known as alumina, or the oxide of the metal aluminum, is, next to the diamond, the hardest substance known, and is used for cutting. Emery is granulated corundum, mixed with magnetic iron, and the polishing and cutting properties of this substance are generally recognized. It is not so well known that pure corundum possesses equal, if not superior, qualities. A fine grade of corundum has been recently found in Ontario, the analysis of which shows over 95 per cent corundum, .87 per cent silica, .80 per cent iron, and a fraction over 1 per cent of water. It is claimed that the purest emery shows only about 79 per cent of pure alumina, or corundum. This new grade of the mineral, known as crystal corundum, is used in vitrified wheels, and it is claimed that these show 50 per cent more efficiency than other abrasives

in common use, both as to cutting qualities and endurance. The purity of the substance, and the absence of non cutting, or rubbing elements, prevents it from drawing the temper of the tool being ground. It is believed that this will prove to be the most efficient abrasive known.

It is worthy of note that the transparent varieties of corundum are prized as gems, the blue being the sapphire, the violet the Oriental amethyst, the red the ruby, and the yellow the Oriental topaz. The opaque corundum, such as is used for grinding, is found in China, the Ural Mountains, New Jersey, Pennsylvania, North and South Carolina, etc., as well as in Canada.

Manufacture of Incandescent Electric Lamp Bulbs.

In the manufacture of incandescent electric lamps, etc., it is necessary to form a hole or opening to permit the connection of a branch tube by welding it to the edge walls of the opening. In the case of incandescent electric lamps, the bulb comes from the glass-blower with a single open tubular extension at the stem end, at which the glass pillar which supports the filament is sealed fast. It becomes necessary to form an opening at some other part of the lamp in order to permit exhaustion of the air, and it is common to form a hole in the center of the dome to which a small glass tube is fused, this tube being connected with an air-pump when the vacuum is made. The hole is formed in various ways, commonly by applying a flame to the point at which it is made, and after the glass has been made sufficiently soft, the operator blows it into the bulb with a quick exhalation, thus swelling the glass around the hole to extreme thinness and bursting it, leaving a ragged edge of the desired size.

It is the object of an invention recently patented by Mr. William R. Burrows, of Newark, N. J., to accomplish the above described result with greater uniformity than is possible by such a method. A better result is obtained by mounting the bulb in a support and permitting a long slender blow-pipe flame to play vertically at the point where the hole is desired, at the same time placing in communication with the open end of the bulb a mild air-pressure, which when the glass reaches the proper stage of softness, blows a clean round hole eminently fitted for the connection of an extension-tube. The intensity of the flame is such that no ragged edge or fine glass are left as a residue after the operation, thus greatly improving the operation from the standpoint of health of the operator, as the fine fragments of glass are easily broken and form a dust which is very objectionable in the operating-room.

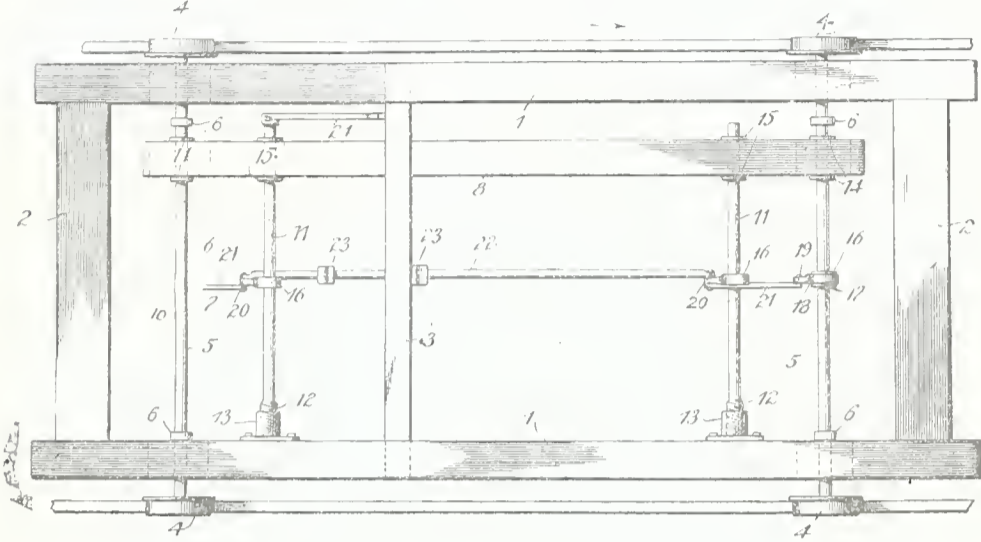
To keep themselves posted in the progress of the art in which they are interested, inventors and manufacturers should subscribe for the INVENTIVE AGE, which publishes a list of all patents issued each month. The low subscription price and the character of the publication, entitle it to the support of all the inventors of the country.

CLEVER NEW PATENTS.

OFFSET MECHANISM.—STAND.—DESK AND TYPEWRITER CABINET.
METAL-CUTTING MACHINE.—HARROW.

Offset Mechanism.

Lumbermen will undoubtedly be interested in a new offset mechanism for saw-mill carriages, which has been patented by Mr. Arnold J. West, of Aberdeen, Washington, and appears to be entirely practicable. Certainly it is very simple. The saw-mill carriage frame is shiftable laterally on the axles which bear it, and is provided between its ends with a transverse beam 3. A bar, shown at 8 in the accompanying figure, is journaled upon the axle and held against movement longitudinally of the same. In this bar are journaled

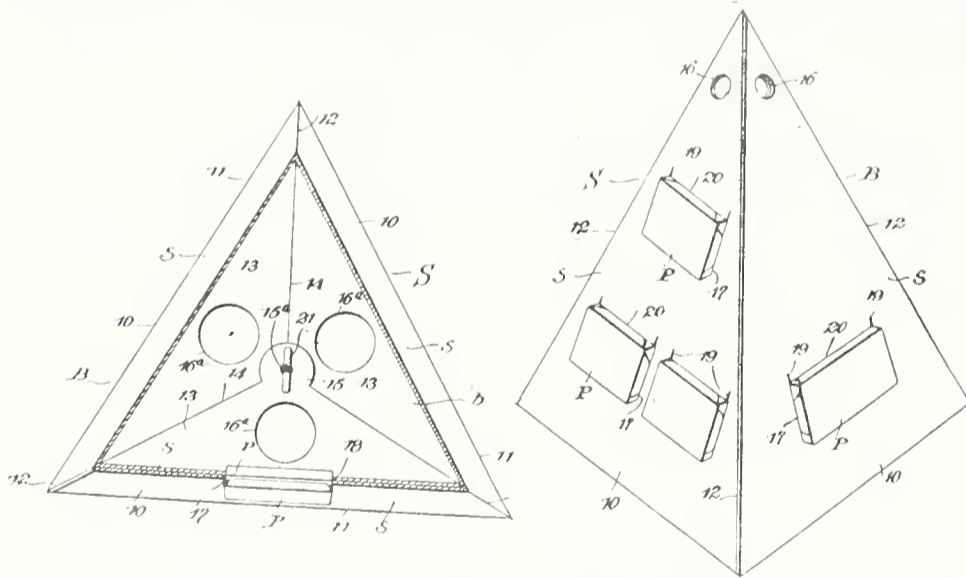


screw shafts 11, that are threaded into blocks 13, fastened to one side of the carriage frame. Friction devices are carried by the axles and are connected with the screw shafts, while one of said shafts is also provided with a handle lever. With this arrangement it will be apparent that when the shafts 11 are operated, the threaded portions thereof, engaging in the blocks 13, will cause the sliding of the carriage frame upon the supporting axles 5, so that the offset movement is thus obtained.

The invention may be applied to saw mill carriages of ordinary form.

Stand.

A display stand and holder for advertising purposes is the subject matter of a patent obtained by Messrs. David K. Wade and Ralph C. Wright, of McPherson, Kansas. The stand is formed entirely from a single sheet of cardboard or the like which can be shipped in the flat and readily set up when desired. The blank is so formed that when properly bent, it will form a triangular pyramid having bottom flaps that may be secured together by a single fastener. The various sides are provided with openings 17, and

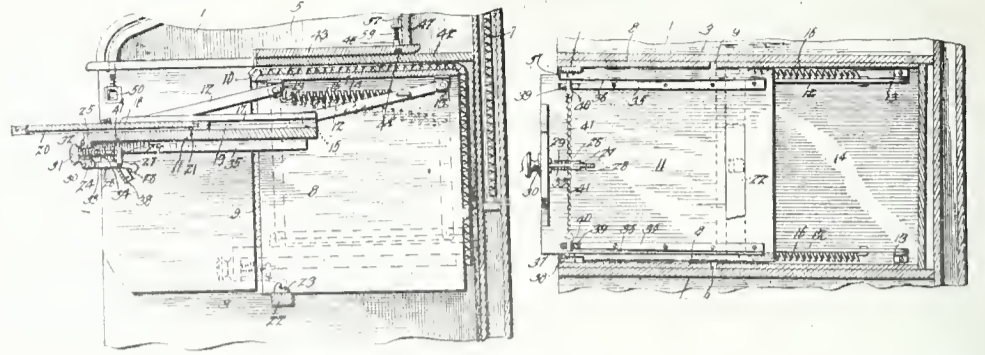


tongues, the openings being arranged to receive boxes P, containing the articles to be vended, the tongues formed along the edges of the openings serving to hold the boxes in place. The illustrations herewith presented are respectively a perspective view of the stand or holder with the boxes in place, and a horizontal sectional view, clearly indicating the general shape of the device.

Desk and Typewriter Cabinet.

The accompanying views are respectively a vertical section and a horizontal section through a combined desk and typewriter cabinet, patented by Mr. John Gramelspacher, of the Jasper Furniture Company, Jasper, Indiana. The ordinary writing platform of the desk is provided with a hinged front leaf that can be thrown back, as shown in the first figure. Beneath the rear section or leaf is suspended, by means of links 12, a typewriter support having a sliding platform, on which a typewriting machine can be mounted. Under ordinary conditions this support with the typewriter is suspended beneath the writing platform, as indicated in dotted lines, and is locked by a suitable latch. It

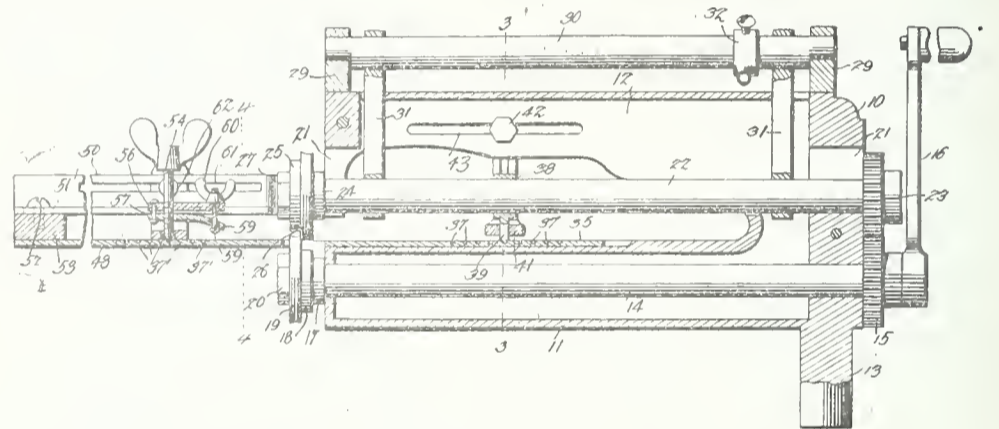
can be covered by a flexible curtain or roller top 10, mounted beneath the platform leaf. Under ordinary conditions, and when not wanted for use, the typewriter is covered and the front leaf of the platform is swung to its horizontal position, so that the desk may be used in the usual manner. When, however,



it is desired to employ the typewriting machine, the front leaf is thrown back and the machine with its support is swung upwardly and locked. It is therefore in convenient relation to the operator. The movement of the machine is assisted very materially by springs connected to the rear links.

Metal-Cutting Machine.

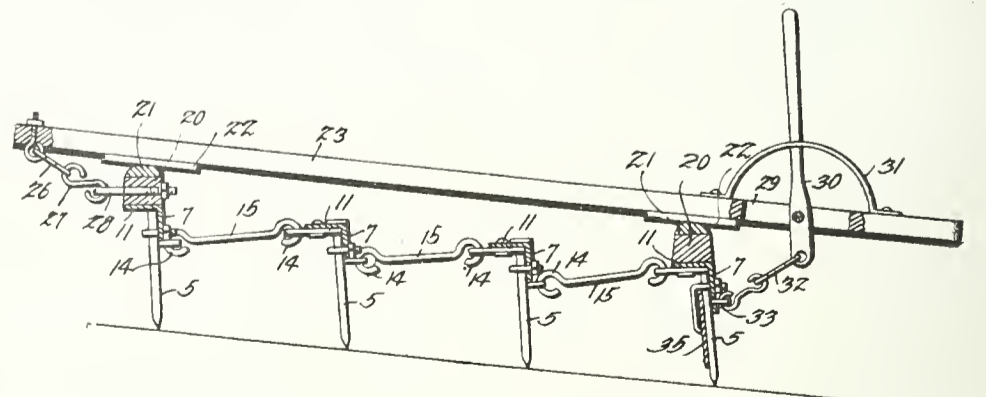
A well known resident of Walnut, Kansas, Mr. John H. Doub, has secured a patent on a metal cutting machine employed for sheet-metal ware and useful for trimming cylindrical bodies, such as stove pipes, drums, and the like, and also in making curved or irregular cuts as well as for rounding disks. A suitable frame is employed in which are journaled two parallel shafts 14 and 22 geared together, and one having a handle crank. The other shaft is slung in a hanger frame, suspended from a rock cam by means of which the shaft may be raised or lowered with respect to the shaft having the handle. On the rear ends of the shafts are mounted overlapping coating cutting disks or



wheels 19 and 26, grooved peripherally, and so arranged that they may be reversed in order that both edges may be used. Adjustably mounted between the shafts, and having a connection with one, is a combined center punch and pivot 39, upon which a plate can be mounted, for the purpose of cutting a disk from the same. A novel construction of gage is also employed in connection with the machine and is mounted outside the cutters. The entire machine is extremely simple, as will be apparent from the cut appearing herewith.

Harrow.

Alexander W. England, of Columbia, Tenn., has perfected several important improvements in harrows and cultivators, and has lately procured another patent on a simple construction of spike tooth harrow. He employs a central draft bar 23, and beneath the same transversely thereof are located the tooth bars, formed of angle iron. Spike teeth pass through certain portions of the flanges of the bars and are clipped to the other flanges. The front and rear tooth bars are provided on their upper sides with bearing blocks 20, shod with



convexed plates 21, that bear against other plates secured to the under side of the draft bar. One of the end tooth bars is furthermore connected by links 26, 27, to the adjacent end of the draft bar, while a lever connection 30 and 32, is provided between the other end tooth bar and the opposite end of the draft bar. The tooth bars are also linked together in a suitable manner. With this arrangement, the structure may be tightened or loosened as desired to conform to the character of the soil operated upon.

MECHANICAL EFFECTS IN STREET-CAR ADVERTISING.

STREET car advertising has assumed considerable proportions during the past few years. There was a time when a few printed posters or cards were the only advertising mediums employed in street cars, and the general public had but little interest in them. But, during the past few years, professional advertisers have developed the scope of street-car advertising, so that today it is one of the important branches of the advertising business. Street car advertising, like any other line of advertising, is based upon the degree of attractiveness, beauty of design, and appropriateness of pattern. Owing to the fact that there is motion in a street car, it is possible to originate and develop extensive lines of mechanical contriv-

A. There are a pair of miniature boots of attractive character placed upon the feet as shown. A head is cut out of wood and a hat is made and placed upon the head. Then comes the painting, which is done with greyish colors for the suit, and appropriate colorings for the face to bring out the features. This figure is given motion by merely supporting it by using spiral spring wires, *B* and *C*. The wires at either end are joined to wood or metal pins at a foot apart. There is a card of the firm supported in the hand of the figure. The vibrations of the car in running impart the necessary motion to the figure to produce a ludicrous effect. The figure is supported up out of the way near the top of the interior of the car on a line with the other

head piece which may be used to good advantage to advertise hats. It consists of a flat disk of wood, about ten inches in diameter. On the front is painted the features of a person with the eyes, nose and mouth blank. In these blanks are inserted the revolving disks, *H*, *I*, *G*, and *J*. The disks are so made that they fit on pins, and are adjusted flat on the front side of the face of the figure. The pins on which the disks revolve pass through to the little wheels shown by the circular forms on back. These wheels or disks of wood are grooved and they carry the belt. The drive belt is marked *F*. Motion is obtained from a motor on the car, or by power and transmission from any source available. From the front, the effect of the face with the revolving eyes, nose, and mouth, is singular and amusing. The hat sign of the firm is placed in view. A hat is fixed on the head of the figure.

Figure 4, is a sketch of a glass from which a jet of steam is emitted at intervals, in such a way as to represent discharging volumes of soda. The glass utensil is marked *K*. The necessary advertising sign is placed nearby. There is a connecting pipe, *L*, with the cylinder, *M*, and feed tube, *N*. A little alcohol light heats the cylinder of water and generates steam. The check valve is weighted so that it lifts and opens only when sufficient pressure is exerted. As soon as the pressure relaxes, the valve closes. The discharge of steam is shown in the view, and during the interval, has the appearance of soda water gases.

Figure 5, is another style of advertising figure for street cars, but it has no mechanical motion. There is a section of track obtained, made of wood. This is marked *P*. A wheel is purchased or made from wood, and placed on the track. This design could be painted on canvas or other material, but the effect is greater when the parts are made from some material and properly painted. There is a shaft or axle on which is hung the sign card. This combination, like the others, is placed up above with the signs.

Figure 6, is a little design in street car advertising that will serve for a while. The affair can be modelled with devices and appear quite real. There is a brake wheel and shaft set up as at *R*, and a rope, *S*, running to *U*. There is a wheel or disk at *T*. The wheel cannot be braked of course, because to turn the wheel and shaft, *R*, would mean merely to wind the rope and pull the brake shoe away from the wheel. Therefore, the idea is that one

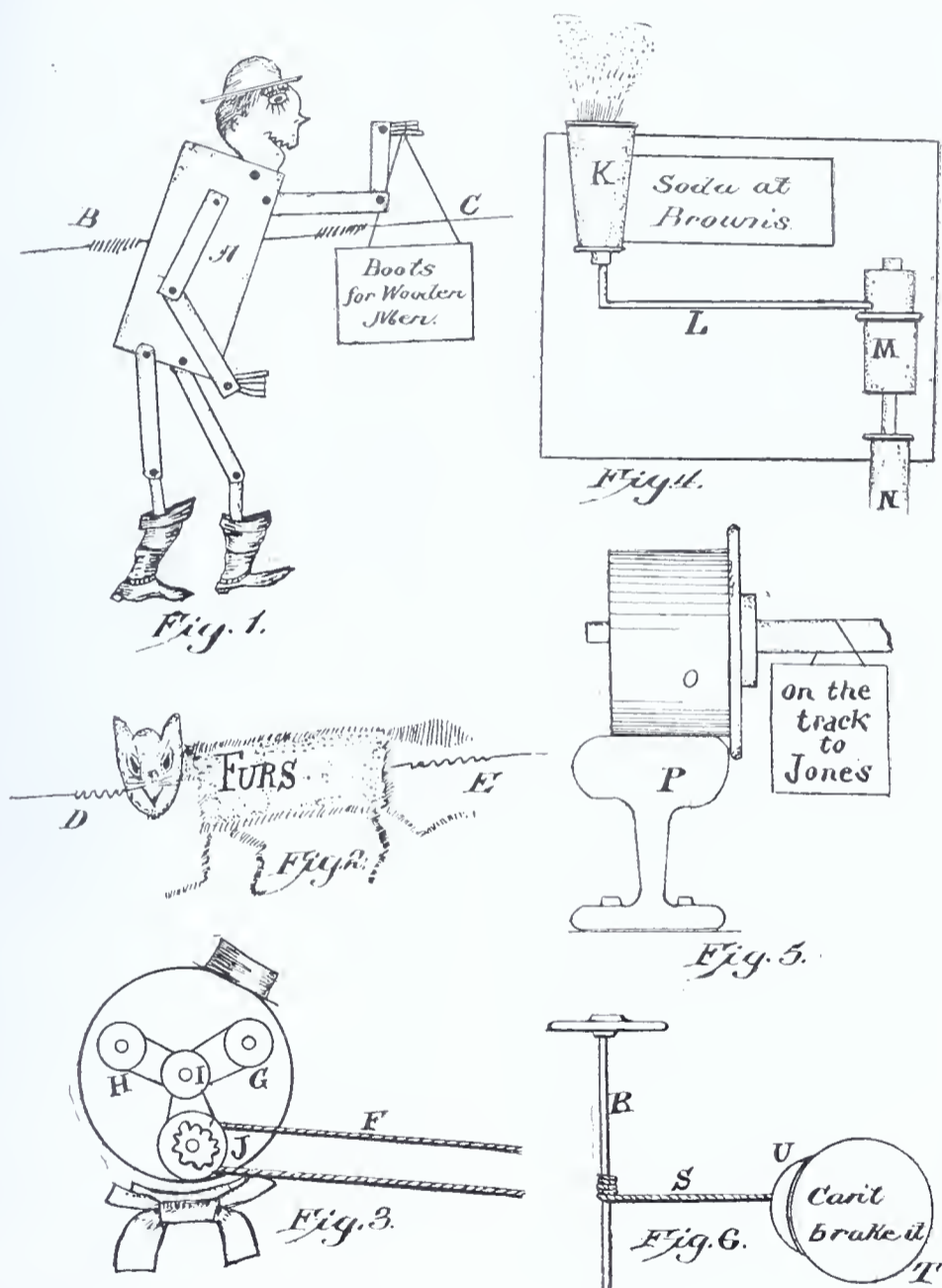
cannot brake it. Something of the sort could be used in connection with an advertisement of suspenders.

There is, no doubt, a brilliant future for real artists in the line of street car advertising. It is becoming more and more of a science, and promises not only to increase in importance, but to become very remunerative to people who make designs and get out suggestions for this purpose.

Uncalled-for Applications of Wireless Telegraphy.

It is quite apparent that if wireless telegraphy is practically operative at all, it should be feasible to apply it as a means of communicating to and from moving trains. Hence we hear of various inventors who are assiduously applying themselves to accomplish this result, seemingly without asking whether, if their efforts should be successful, there would be any demand for such a system of inter-communication. It is not novel to accomplish such a result. It was done long ago by Phelps, Edison and others by induction telegraph methods in a very simple and successful manner, but there was no demand for it; and it is, therefore, not likely that a system not nearly so simple, economical, or, it may be assumed, reliable, will create such a demand.

Another somewhat unnecessary proposed employment of wireless telegraphy has recently been proposed and tested, namely, for automatic fire alarm telegraph purposes. For this work nothing could well be more simple, reliable and practical than the ordinary wire circuit connecting the building to be protected with firemen's headquarters. Such an alarm system, to be of any practical utility, must give automatic evidence of some kind when defects of any sort arise; or it must be feasible to test the circuits and apparatus at regular intervals. All this is readily done from headquarters by the existing wire telegraph systems, with little or no complications at the protected building. With wireless telegraph apparatus, however, a complete transmitting and receiving system would be necessary at each protected building to effect the results just mentioned, the cost of which would, doubtless, be many times more than the cost of a connecting wire. Besides, who is to keep the coherer, induction coil, battery, and other accessories in adjustment night and day in the various stations? The moral of which is, why waste time, energy and money in demonstrating that certain things can be done by wireless telegraphy when they can be, and are, done much more satisfactorily by other means?—*Cassier's Magazine*.



ances, that otherwise would be impossible. The attached illustrations are presented with a view of suggesting some of the possible moving figures for street car advertisements.

In figure 1, is exhibited a boot and shoe manufacturer's moving figure. This figure is made up of pieces of movable wood. The body piece is a piece of pine about eight inches high and three inches wide. This forms the base work for the arms and legs. These are hung to the figure in the manner shown by means of little wire fastenings or pins. The arms and legs are made of strips of wood jointed as represented. The body-piece is marked

advertisements.

One street car advertisement that attracts notice consists simply of a painted wood cat, with bushy tail and wire wound or twisted legs. As, in the case of the previous figure, the only mechanical motion derived is from the pair of spiral springs, *D* and *E*. These springs are jointed to parts of the frame work of the car up among the signs, and every motion of the car, of course, vibrates the figure and causes it to bob just enough to draw the notice of the passengers. There is a sign of a fur firm near the figure.

Figure 3, is the back portion of a

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MECHANICAL INVENTIONS AND DESIGNS

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Charles T. Jones, Lynchburg, Va., inventor; The Glamorgan Pipe & Foundry company, assignee, same place. **Fire Hydrant.**—The invention relates to fire hydrants wherein the controlling valve is normally seated by the water pressure from the main, and the object of the invention is to provide a water-tight joint or connection between the valve and the valve stem, so as to prevent the water from the main leaking into the body of the hydrant when the valve is closed. The invention consists in providing the valve stem with a screw-threaded terminal, and the pressure valve with a screw-threaded socket receiving the end of the stem, the opposite face of the valve being entirely free from joints, and provided with a guide socket to receive a projection carried by one of the walls of the hydrant. By this means the valve is guided in its seat, and at the same time, the stem of the valve is protected from the action of the water.

Thomas W. Hinde, Cherokee, Iowa. **Flue Cutter.** Mr. Hinde has obtained a patent disclosing a distinct improvement in that class of flue cutters which comprise a cylindrical casing designed to be inserted in the flue and having a knife connected to a spindle, which latter is first rotated independently of the casing to project the knife outwardly against the wall of the flue, and is then rotated in unison with the casing to effect the cutting of the flue by the knife. One of the novel features of this latest development is an anti-frictional bearing sleeve mounted on one end of the cutter casing to reduce the friction between the casing and the interior of the flue. Another feature is a novel locking device for preventing the accidental movement of the knife to its cutting position during the withdrawal of the cutter from the flue; and a still further feature embodies a novel form of operating mechanism capable of being easily adjusted to accommodate the cutter to various flues in which it is intended to operate.

Harry P. Oler, Camden, N. J., inventor; Joseph Davis, assignee, same place. **Trolley Pole.**—Mr. Oler's invention relates to a novel mounting for a trolley pole designed particularly to permit the wheel and the harp to move independently of the pole in rounding curves, or in accommodating lateral deflections of the wire. Ordinarily it is necessary for the pole to swing under such conditions, and as the weight of the pole prevents prompt response to the effort made by the wheel to keep the wire, the result is that the wheel jumps the wire, and thus causes delay and annoyance before it can be returned to position. Mr. Oler's idea is to have the harp swiveled in the upper end of the pole, and to have its arms bent back at an angle, so that the wheel will be in rear of that point at which the axle of the pole intersects the line wire. By this arrangement, the wheel is permitted considerable lateral movement without necessitating corresponding movement of the pole.

Joseph J. McLoughlin, Chicago, Ill., inventor; Seam for Wearing Apparel.—The invention is designed with particular reference to the procuring of a strong, neat seam adapted for use in the manufacture of articles of apparel made from very light fabric, as for instance, serge or the like, the idea being to present upon the reverse side the appearance of a capped or tape-bound seam, such as are ordinarily used in connection with unlined garments intended for summer wear. In forming

the seam, a piece of fabric has its edge folded and refolded to form a welt enclosing the raw edge. A second piece of fabric is united at a point removed from its edge to the first-named piece by a line of stitching, and after being folded over this stitching to obscure it on the right side of the fabric, a second line of stitching is passed entirely through the welt of the first-named fabric and through both layers of the other piece immediately adjacent to the raw edge of the latter.

Henry H. Weaver, Greentown, Indiana. **Pencil Holder.**—The invention relates to means for holding pencils, pen-holders, and fountain pens in the vest-pocket of the user; the object being to provide improved means which will cooperate with the inner walls of the pocket so as to obviate accidental displacement, and at the same time not interfere with the insertion and removal of the article into and from the pocket. The device may be transferred from one article to another, and when in use does not interfere with the ordinary manipulation of the article. It consists of a rubber cylinder internally and externally smooth, formed with a comparatively thick eraser closing one end of the cylinder, and having a thin elastic annular flange flaring from its opposite end, the said flange being adapted to engage with the walls of the pocket, so as to prevent the accidental dropping of the pencil, etc., therefrom.

James M. Crowley, Carl Junction, Missouri. **Pump.** A novel and highly ingenious pump has recently been patented by Mr. Crowley, for enabling water to be lifted a considerable distance by a very short stroke. The pump is thereby adapted to be operated within a comparatively small space. Also, with the pump of this patent, it is unnecessary to provide a column pipe. The pump is provided with a pair of buckets, open at the bottom and cooperating with valves, movable toward and from the bottom of the buckets. The mechanism for raising and lowering the buckets consists of quick-acting lazy tongs, and is provided with means for holding the buckets stationary during a portion of the down-stroke, whereby the contents of the buckets will be discharged into a suitable trough.

James M. Crowley, inventor; Charles F. Brown, assignee, Carl Junction, Missouri. **Rotary Motor.**—The primary object of the invention is to provide a motor which presents a comparatively great and substantially continuous surface to the action of the steam or other fluid, thereby affording a powerful and easy running engine. Another object is to construct the parts so that those subject to the greatest wear can be readily removed and replaced by new ones. Within a suitably formed casing are mounted a pair of parallel rotary pistons, each of which is provided with three spiral worms or abutments, said abutments interlocking. The abutments are made in sections and are detachable. The end pressure upon the pistons is received against ball bearings which thus greatly reduce the friction, and these ball bearings are removable so that when they become worn, they may be readily replaced by new ones.

Cartwright J. Edney, Shawnee, O. T., inventor; George H. Kerfoot and William S. McMillen, same place, assignees. **Churn.**—The churn of this patent, which is characterized by great simplicity and durability, is designed to be mounted upon the wall of a building or other upright support in convenient position for enabling the churn body to be applied to, and removed from, the churn without interfering with the operating mechanism. It consists of a bracket having a back for attachment to a wall, and provided with horizontal arms, in which is journaled a rotatable head. A vertically-disposed approximately triangu-

lar oscillatory frame is pivoted at the top to the bracket, and it carries a flexible connection, which is wound around the rotatable head. The latter carries the churn dasher, and when the frame is oscillated, the dasher will be rotated.

Lewis H. Bowman, Los Angeles, Cal. **Hook.**—The device covered by this patent is a snap hook, the main body of which is constructed of wire formed with an eye at one end and parallel similarly-shaped hooks at the other. Between these hooks and the shanks thereof is slidably mounted a locking device, formed of a sheet metal plate, having a forwardly projecting tongue that is movable across the throat of the hooks to close the same, and having an upstanding operating hook movable between and within said wire hooks. The locking device is slidably secured to the shanks of the wire hooks by means of loops formed integral with the sheet metal and bent about the shanks.

Victor J. King, Trumansburg, New York. **Waist Holder and Skirt Support.**—This is a very simple device comprising a plurality of sheet metal sections arranged end to end, and each having a body plate provided with openings in its ends. A belt is passed through the end openings and extends longitudinally across the outer faces of the sections, being provided with a suitable buckle. Each section, furthermore, has flanges bent over its opposite side edges and inwardly over the opposite faces thereof. The flanges are divided by slots into spaced sections, the corresponding slots being aligned to permit the free bending of the body plates. Teeth are cut on the free terminals of the flanges, the upwardly extending teeth being arranged to engage the skirt and the downwardly depending teeth engaging the waist.

Felix S. Towle, New York, N. Y. **Copy Holder.** Two patents.—The first patent discloses an ingenious stenographer's notebook holder arranged to be used as a lap support while taking notes, and having means for supporting it at an inclination while the notes are being transcribed. The copy holder, which is exceedingly simple and inexpensive, comprises a flat sheet metal plate having a foldable support or leg at its back, and provided at its front side with a pair of retaining clips which grip the back of the book. Above these clips a plate is formed with a transverse slot, through which the leaves pass after being transcribed.

The other patent discloses a somewhat similar structure, but different therefrom in several respects. In the first place the clips which engage the back of the notebook are adjustable to accommodate backs of different sizes. Then again the slot which receives the transcribed leaves is open at its upper side so that the leaves will enter the slot when being thrown back by a natural movement. Retaining devices are provided to prevent the leaves from coming out of the slot after being turned back; and adjacent to the bottom of the plate, the latter is provided with a pair of slits through which is threaded a calendar strip or ribbon. The plate is also provided with hooks for supporting loose copy sheets, and serving also as a pencil rack.

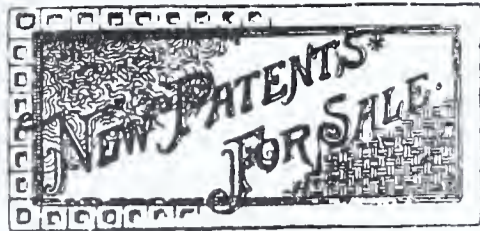
Clarkson H. Goodwin, West Chester, Pa., inventor; Waterproof and Non-Conductive Shoe.—This invention is intended especially for the protection of electric workers, the idea being to encase the feet of linemen and others in waterproof and non-conductive footwear, and thus prevent accidental electrocution in the event of contact with a live wire. The shoe is provided as usual with inner and outer soles, and with an intermediate slip sole. The slip sole is composed of superposed layers of cork and rubber which effectually excludes moisture and form an insulation. Around the shoe is extended a folded cushioning strip re-

tained between the united edges of the welt and upper. Within the fold of this strip is located a continuous core of compressible non-conductive material, as for instance, rubber, which not only serves to decrease the conductivity and to further exclude the moisture, but also cushions the tread.

Robert G. Rate, Iowa City, Ia. **Husking Mitten.**—Mr. Rate has secured a patent for a husking mitten having a horizontal pin secured across the face thereof and retained by a grip strap, which not only prevents the pin from slipping in either direction, or from working out of position, but attains these ends without unduly constricting or cramping the hand of the user. Adjacent to the back of the pin is a shield extending around one edge of the mitten and connected to the pin and to a shield strap, which has adjustable connection with the grip strap.

Robert G. Rate and Matthias Mattes, Iowa City, Ia. **Glove.**—This invention relates more particularly to that class of gloves known in the trade as combination gloves, and distinguished by a palm or front portion made of higher grade material than that from which the back, or forgettes composing the back, are made. Heretofore the front has been cut from a single blank, and in order to secure the necessary fullness in the glove fingers, the forgettes or finger backs have been widened at their upper ends. As a consequence the finger seams have been thrown in front of the finger, which is highly undesirable for the reason that they are thus located at the points of greatest wear, not only tending to hurt the hand of the wearer but exposing the inferior material where it quickly becomes worn and destroys the usefulness of the glove. To prevent these seams from being disposed at the front of the glove, the patent describes a combination glove in which the palm portion is provided with finger portions, which are wider at their outer extremity than where they join the palm. The finger backs are of complementary form, that is to say, they have their outer extremities narrower than their bases so that, while the necessary fullness of the fingers is secured, the seams will be remote from the front of the fingers, particularly at their outer ends where the greatest wear ordinarily occurs.

James K. Cochran, Chicago, Ill. **Cotton Compress.**—This invention appears to mark a distinct advance in cotton baling. The structure includes a pair of cylindrical presses arranged for alternate use, so that a bale may be formed by one while the finished bale is being removed from the other press. Above these two presses are arranged suitable guides, upon which operates a bat compressing and folding device having a reciprocatory movement which serves to fold the bat back and forth, layer upon layer, in the press box, the bottom of which is formed by a hydraulic piston. At an elevated point is located a gin casing at the bottom of which is an endless belt arranged to receive the loose staple and to feed the same out at either end, above one or the other of the presses. By an ingenious arrangement of gearing, the belt in the casing, is automatically driven in the proper direction to supply the staple to that press which is in operation, the pressing and folding devices serving to compress the loose bat in detail and to fold it back and forth in the box as stated. The gins and condenser operate continuously, and as one or the other of the presses is thrown into action, the belt is driven in the proper direction to supply it with staple. By this arrangement it is possible to utilize a continuous feed to secure detailed compression of the cotton, and to produce bales of uniform shape and size and of any desired density, at least four sides of the bale being perfectly flat to provide a perfect package for storage and transportation.



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FOR SALE—U. S. Patents No. 745,405, 745,406, December 1, 1903, and Canadian patents No. 78,575, December 9, 1902 and No. 81,989, July 21, 1903. Painting and cleaning apparatus. Correspondence solicited. Address, J. R. Marcotte, 378 St. Andre St., Montreal, Canada. my

FOR SALE—Design patent No. 24,481, July 16, 1895. Follower for culinary vessels. Useful in every household. Can be made at small expense. Address, Matej Kratky, Utica, S. D. my

FOR SALE—Patent Trace Fastener. Will trade for land or stock in reliable company. Address, W. G. Lee Woods, San Antonio, Texas. my

FOR SALE—Patent No. 737,169, dated August 25, 1903. Machine for molding artificial stone. Address, E. W. Stevens, Norristown, Pa. apr

FOR SALE or on royalty—Patent No. 727,762, dated May 12, 1903. Windmill. For sale by states, or to be manufactured on a royalty. Address, George B. Edgar, 102 Maryland St., Lawrence, Kans. apr

FOR SALE—Whole or part of patent No. 719,403. Acid holder for fire extinguisher. Compare with others in use, and address, if interested, John L. Williams, Westville Station, New Haven, Conn. apr

FOR SALE—Patent No. 744,483, dated Nov. 17, 1903. Automatic pump for inflating wheel tires. Will sell the exclusive right, or on royalty. Address, W. F. Carlberg, Sisseton, S. D. apr

FOR SALE—United States patent No. 691,769, dated January 28, 1902, and Canadian patent No. 79,577, dated March 10, 1903. Hoop Tightening Device. Address, Caspar Hummel, 324 Catherine Street, Johnstown, Pa. apr

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FOR SALE—Patent No. 743,991, dated November 10, 1903. Multiple plug. Screws into ordinary Edison socket. By means of it two, three or more electric lamps or fans can be run from the same socket. Address, Kent Shaffer, The Hill School, Pottstown, Pa. apr

FOR SALE or on royalty—Patent No. 742,739, dated October 27, 1903. Rail joint. This invention aims to provide a secure and rigid joint for the meeting ends of railway rails, which will resist any tendency to play of said ends either vertically or laterally and result in a practically continuous rail, thereby obviating the jar commonly experienced when the wheels of a car pass over joints of the rails. Write, Wm. H. Rehmer, Asheville, Kans. apr

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FOR SALE—United States patent No. 746,828, A pipe fitting rotatable to any degree of a circle from a straight line to a return bend, in fact all pipe fittings in one, except a tee. Address, W. C. Crawford, Muncy, Pa. apr

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THE DIVISION OF APPLICATIONS FOR PATENTS.

AN IMPORTANT DECISION.

No decision rendered by the Supreme Court of the United States in recent years has attracted more attention among patent attorneys, or is of greater importance than that recently announced in the case of *Steinmetz vs. Allen*, Commissioner of Patents. The circumstances of the case are as follows:

It appears that Steinmetz filed an application for patent in the Patent Office on November 21, 1896, for certain new and useful improvements in motor meters, and expressed his invention in thirteen claims, the same including the method of actuating the meter and the construction of the meter, thus presenting in one application claims for the method and the apparatus. The claims were held by the primary examiner of one of the Electrical Divisions of the Patent Office to involve two separate inventions, and he required a separation of the process claims from the apparatus claims, in accordance with Rule 41 of the Patent Office, which is as follows:

"Two or more independent inventions can not be claimed in one application; but where several inventions are dependent upon each other and mutually contribute to produce a single result, they may be claimed in one application.

Claims for a machine and its product must be presented in separate applications.

Claims for a machine and the process in the performance of which the machine is used must be presented in separate applications.

Claims for a process and its product may be presented in the same application."

The applicant persisted in his application as filed, and refused to divide the claims, whereupon the primary examiner repeated his order for a division of the claims. The applicant regarded such second action as a final rejection of his claims, and appealed

to the Board of Examiners-in-Chief, the intermediate appellate tribunal of the Patent Office. The primary examiner refused to answer the appeal, taking the ground that under the Rules a question relating to division was only appealable to the Commissioner of Patents, since it was a "formal" matter and did not relate to the merits of the invention. Thereafter, the applicant petitioned the Commissioner of Patents to direct the primary examiner to forward said appeal, which petition was denied: whereupon, a petition in mandamus was filed in the Supreme Court of the District of Columbia, to compel the Commissioner of Patents to require the primary examiner to forward the appeal to the Board of Examiners-in-Chief, to review the ruling of the primary examiner requiring the applicant to cancel certain of his claims in his application. The Supreme Court dismissed the petition, and on appeal, its action was affirmed by the Court of Appeals of the District of Columbia. Then a writ of error was sued out to bring the case into the Supreme Court of the United States, which was opposed by the law officers of the government acting on behalf of the Patent Office.

The jurisdiction of the court to review the judgment of the Court of Appeals was immediately called in question, but the Supreme Court very promptly ruled in favor of the petition. Then the right of the petitioner was attacked. Now, the Patent Office has always had a rule in its practice requiring division, and it would seem to be proper that some such rule should be in force, but the objection urged by the Supreme court against Rule 41, was that it was in violation of the Statute. As stated by the court: "The Statute gives the right to join inventions in one application where the inventions are related, and it cannot be denied by a hard and fixed rule which prevents such joinder in all cases. Such a rule is not the exercise of discretion; it is a determination not to hear. No inventor can reach the point of invoking the discretion of the Patent Office. He is notified in advance that he will not be heard, no matter what he might be able to show. His right is denied, therefore, not regulated."

Commenting further under this head, the court said:

"The Patent Office has not been consistent in its views in regard to the division of inventions. At times convenience of administration has seemed to be of greatest concern; at other times more anxiety has been shown for the rights of inventors. The policy of the Office has been denominated that of "battledore and shuttlecock," and Rule 41 as it now exists was enacted to give simplicity and uniformity to the practice of the Office. Its enactment was attempted to be justified by the assumption that the patent laws gave to the Office a discretion to permit or deny a joinder of inventions. But, as we have already said, to establish a rule applicable to all cases is not to exercise discretion. Such a rule ignores the differences which invoke discretion, and which can alone justify its exercise, and we are of opinion, therefore, that Rule 41 is an invalid regulation."

Having settled the right of ap-

pellant, and declared Rule 41 of the Patent Office Practice to be invalid, the court then took up the question as to what remedy the petitioner should have. The attorneys for the Patent Office contended that mandamus should not issue against a public officer except to compel the performance of some plain, clear, ministerial duty, and should not issue to control his discretion. The court commenting on that proposition stated, "that if an appeal cannot be compelled from the decision of the primary examiner, on a requirement of division, an applicant is entirely without remedy." The court refused to listen to any such suggestion, and having determined that the petitioner had a right, decided that a petition in mandamus furnished the remedy, and gave judgment, reversing the action of the Court of Appeals of the District of Columbia, with directions to reverse that of the Supreme Court of the District of Columbia, and direct the latter to grant the writ of mandamus as prayed for.

It is too early to forecast what will result from this decision. It is plain though, that since the Supreme Court has declared Rule 41 of the Rules of Practice of the Patent Office invalid, that the Patent Office has no right to require division in any case as long as that invalid regulation stands. It is also clear that applicants in the future have the right to appeal to the Board of Examiners-in-Chief in applications where division is required, and can carry such appeals to the Court of Appeals of the District of Columbia. The inevitable result will be that the Commissioner will no longer control the question of division as he has been able to do in the past.

It has been suggested that possibly the Patent Office will seek to limit the decision to cases where process and apparatus claims are included in the same application, but it is impossible to see how such a conclusion can be reached after reading the sweeping decision of the Supreme Court. Certainly it would be unfair to the court to assume that their decision applies only to cases where process and apparatus claims are involved. If such an attempt is made to limit the decision, it is manifest that the Patent Office will have other petitions in mandamus to respond to, for with the decision to back them up, it is believed that the Supreme Court of the District of Columbia would not hesitate to grant a writ of mandamus on the Commissioner, should the latter refuse to instruct the primary examiner to forward an appeal to the Board of Examiners-in-Chief on a matter relating to the division of an application.

Whatever may be the outcome, it is believed that inventors are bound to profit by it, for the present conditions, so far as the question of division is concerned, is unbearable. Applications are being split up into infinitesimal parts, simply because the Patent Office has formed sub-classes of inventions throughout the Office. The rights of inventors have apparently been disregarded, and merely the convenience of the Office considered.

If the Patent Office will return to a sensible and logical plan of requiring division, such as outlined by Commissioner Hall in the well-known case of *Ex Parte Wilcox & Borton*, it will rally the practitioners to its support; but so long as the present conditions prevail, and the claims of applications are split up into parts merely to accommodate the classification of the Patent Office, attorneys will be bound to contend against the validity of such a practice.

New Fire-Resisting Material.

The manufacture of an absolutely trustworthy fire-resisting material, for purpose of construction, has been the subject of protracted experiment and research, and many considerations present themselves which make the solution of the problem more difficult than would appear at first sight. The material must be able to withstand intense heat for a long time without disintegration. Its non-conducting powers must be uniform throughout. It must be capable of entirely preventing the passage of flame from any room where fire occurs. After prolonged exposure to fire, it must be able to resist water without serious damage. Exposure to changing atmospheric conditions must not affect it. All the materials employed in the manufacture of the finished article must possess substantially the same chemical, physical and thermal contents. It must be reasonable in price, which involves the accessibility and availability of the raw materials. All these conditions, it is said, are fulfilled in a new material called "uralite" which has come into use in England, and which has even proved so successful that its employment has passed beyond the stage of experiment, and extensive works have been completed for its manufacture near Rochester.

The main ingredient of the substance is asbestos, which is brought from Canada, Russia and the United States. This is cleansed and afterwards mixed with water and chalk, as a binding agent, into a pulp similar to paper pulp. This is rolled into sheets, and in order to secure stability, a small quantity of silicate of soda is added. The sheets thus formed are cut into the sizes required, pressed and dried, leaving boards of fibrous asbestos. These boards are steeped in a solution of silicate of soda; the water is driven off by drying; they are then dipped in a solution of bicarbonate of soda, and again dried. The technical application consists of the impregnation of the asbestos board by silicate of soda and its subsequent decomposition by bicarbonate of soda. This is accomplished by regulating the strength of the two solutions, so as to insure the complete saturation of the whole of the board by the two chemicals, which are mineral in character. In this way, the time of deposition is determined, and after enough of the colloid silica is deposited over the fibres of the asbestos, it is gradually dried until the 75 per cent. of water, natural to freshly formed colloid silicate, is driven off, leaving a hard, dense substance which attaches itself as a cement to the asbestos and thus forms a homogenous mass, incapable of lamination, with no planes of cleavage, and capable of resisting fire to a high degree.

Uralite can be cut with a knife or saw; it can be painted, grained, polished and glued together like wood; it can be veneered, to form panelling for walls, or partitions for ships' cabins or for railway carriages. This panelling will not swell, crack or blister. It does not split when a nail is driven through it: it is not affected when exposed to moisture or to great changes of temperature, and it can be impregnated throughout with any desired color.

Uralite has already been adopted, it is said, for roofing all kinds of buildings, for partitions, ceilings, floors, and for insulating purposes, by electricians, engineers and the builders of ships and railway cars. It is used for engineer's joints, for making deechests fire-resisting, for covering doors, and magazine and cartridge storehouses, and also for cold storage chambers. For nearly all purposes, in fact, to which corrugated iron has hitherto been applied, this new fire-resisting mixture can be used with advantage. As a final and supreme recommendation, it is said that it can be produced at a price that will put it within the reach of the multitude.

SCIENTIFIC

PROGRESS.

A New Filter.

A new filter, of a simplicity of construction that commends it, consists of an earthenware bottle constructed almost up to the neck of a porous material. All that is necessary is to dip the bottle into a larger vessel, or a pond or river, and the water will percolate through and fill the bottle. On the other hand, the filtering material is of such a nature that though the water will filter into the bottle from without, it will be retained, therein, and when poured out in the usual way will be fit to drink. This method is especially adapted for pumps for the use of armies, as water may be pumped from a river and filtered at the same time.

An Electro-Magnet.

James C. Keller and Otto F. Kadow, of Cleveland, Ohio, are the inventors of an electromagnet, the purpose of which is to make the core of an electromagnet in such a shape and in such a manner that it will serve as a mechanical element to perform functions usually performed by outside mechanisms, and to this end the core of the magnet is made of a plurality of members, each separately wound and one of which is movable, so that when the core is energized by the passing of an electrical current through the surrounding conducting-wire, the magnetic field surrounding the energized core is such that the movable member of the core will be attracted and moved toward the other member or members, and will operate other mechanical elements connected with it.

New Building Stone.

A new building material has come into use in England, adapted especially for interior masonry. It is composed of gypsum mainly, or gypsum and sawdust, or gypsum and slag; other raw materials, such as asbestos, etc., can also be employed.

The process of manufacture is to mold in patent iron boxes—each of which holds several square yards of stone, according to thickness. The raw materials are well mixed to form a pulp, in a tub or vat, and the resultant mass is poured into the molding boxes. After about twenty minutes, the box is opened, and the stones are exposed to view ready molded, and are at once lifted out. When taken from the box, the stones are so hard that hundreds can be loaded on a truck without damage to each other. They are exposed to the air until they turn white in color, when they are stacked in a covered shed. They are then ready for use, and are so hard that 40 or 50 can be piled, one above the other to a height of 25 or 30 feet.

The stones are 12 inches long and 8 inches high, but are of various thicknesses, usually from 2½ to 3 inches. They can, of course, be manufactured in any size desired. The materials of which they are composed are usually isolating substances, and the holes through the

stones render them sound-proof to a marked degree.

In erecting a wall, mortar is used only at the points of junction: that is to say, for the lowest and topmost row of stones, and where the partition wall joins the neighboring wall: all the rest of the stones are fitted into each other without mortar, as the coherence on all sides, caused by the conical groove and tongue, renders it unnecessary. When the wall is finished, it receives a coating of plaster and is ready for the paper-hanger or painter. The stones can be used any number of times for temporary partitions, if they are placed on wooden or iron beams provided with grooves.

The simplicity of the manufacturing process, dispenses with the use of any sort of machinery, and the small cost of the working apparatus, would seem to make the production of this new stone unusually remunerative.

Welding Apparatus.

Mr. Hugo Dicke, of Frankfort-on-the-Main, Germany, has assigned to Jacob E. Goldschmid, of the same place, a patent recently obtained by him in this country of an improved welding-apparatus.

The apparatus is applied in heating and welding metal, wherein a flame or several flames of water-gas is or are used for the purpose of locally heating a certain portion of the material with a view of welding parts of that portion.

In the embodiment of the invention, two water-gas burners are employed, carried, respectively, by feeding-tubes for the gas and feeding-tubes for the air. These tubes are formed in a loop or fork, at the apex of which rubber tubes are connected, which lead to the air and gas reservoirs respectively. The tubes for the gas and air are connected by braces, to form a self-supporting structure. Certain parts of the tubes may be elastic, and for that purpose rubber tubes may be employed. In this case a lever is used to lift the front parts of the tubes which are weighted by the burner. This burner is released after having been brought to its place of work. The entire structure is suspended by a hook to a rope and may be carried to any desired place.

Regulator for Cooper-Hewitt Lamps.

A regulator for gas or vapor electric apparatus has been devised and patented by Mr. Peter Cooper-Hewitt, of New York, N. Y., and the patent obtained thereon has been assigned to Cooper-Hewitt Electric Company, of the same place.

In the Cooper-Hewitt lamps, a peculiar phenomenon has been observed at the negative electrode of the same, in the form of a flame springing from the negative terminal towards the positive. It has been found that under ordinary conditions, this negative flame acts as a resistance to the passage of the electric current, particularly when the flame stands in the direct line of current between the positive and negative electrodes of the lamp.

Mr. Hewitt has devised mechanical means for removing this negative flame from the direct path of the cur-

rent, and thereby lessening the total lamp resistance, and he has also found that when the flame is acted upon by a magnet or solenoid, the condition of lowest lamp resistance is attained when the flame lies in the direct path of the current through the lamp. It is found in other words that either a permanent or an electro magnet will so influence the negative flame as to change its character as a resisting medium and cause it to actually lessen the normal lamp resistance. In this connection it is to be noted that the tendency of the flame is to project itself or lie along the lines of magnetic force, and in this way the flame is made very steady by the action of a magnet, so that the normal resistance of a lamp, in which the negative flame is normally controlled, can be governed without essential fluctuation.

Hardening Steel Projectiles.

In the manufacture of hardened steel projectiles, carbon or other steel has been heated to a certain temperature and then quenched in cooling baths of water or oil. This process necessitates exceedingly careful treatment of the steel to avoid water-cracking, and with the most careful handling, there is a tendency to weaken the article treated owing to internal tension.

Mr. Robert A. Hadfield, of Sheffield, England, is the inventor of an improvement in the manufacture of hardened steel projectiles or other articles, the object of which is to obviate the above noted objection.

In accordance with the invention, the articles are hardened by heating to a temperature of 200° or thereabout, and the heated articles are cooled by direct exposure to the action of air in the form of a blast or current, which may be of very low temperature. The temperature to which the article is to be heated will to some extent depend upon the degree of hardness required, and will vary according to the size of the article to be treated. In other words, higher temperatures must be employed for larger articles than is necessary for smaller ones. If a specially hard product be required, the temperature and rapidity of cooling may both be increased. When comparative toughness is required, the necessary hardening temperature will be lower than that herein-before mentioned, and the rate of cooling will depend to some extent upon the composition of the steel to be hardened. The process can be employed for hardening the interior surface of hollow articles by directing the blast or current upon the internal surface which is to be hardened.

Heat-Proof Putty.

Mixing a handful of burnt lime with 120 grams of linseed oil, and boiling down to the usual consistency of putty, then allowing the plastic mass, spread in a thin layer, to dry in a place where it is not reached by the sun's rays, yields eventually a very hard putty. When required for use it is made plastic by holding over the funnel of a lamp, and applied to the articles to be cemented. On cooling, it regains its previous hardness.

New Steam Turbine.

The development of the steam turbine has attracted much attention, both in the United States and foreign countries; and a recent invention of a resident of Schenectady is said to revolutionize the present methods of generating steam power. The machine is designed solely to develop power for the generation of electricity for commercial purposes. The machine consists, in general, of two parts, the dynamo or generator, and the turbine. Instead of being in a horizontal position, however, when set up, both are in a vertical position, with the dynamo resting on top of the turbine. This means a great economy of space in the engine room. The dynamo is circular in form, and revolves around a huge steel shaft. The turbine is composed of three steel wheels, which also revolve around the shaft, and three stationary steel wheels. Notches or vanes are cut in the periphery of each of the wheels, those on the revolving wheel having a convex curve, and those on the stationary wheels a concave curve. Each revolving wheel is superimposed upon a stationary one, thus making the cups parallel. The cups on the revolving wheels are each provided with a nozzle, through which steam is admitted to the turbine. As the steam strikes the cups, the wheels revolve, and the steam is deflected from the convex surface of the cups to the concave surface of a parallel cup on the stationary wheels, thence to a corresponding cup on the next revolving wheel, and so on to the last, whence the steam passes to a condenser and the water returns to the boiler. The result is that the velocity of the new turbine is less than in other forms.

One great advantage is in the saving of space; it is said that eight turbines could be set up in the space usually occupied by a Corliss engine, now universally employed to drive dynamos, while one of the turbines generates as much electricity as the Corliss apparatus. The size of the dynamos can be correspondingly reduced. Further, the turbine is so light, as compared with the steam engine, that it dispenses with the heavy and costly foundation necessary for the latter.

Another advantage is that the turbine does not require as many men to take care of it as the ordinary engine. It is lubricated automatically: the steam does not become saturated with oil, and can thus be used again, and when condensed, the water is not impregnated with oil and does not foul the boiler. It also saves water, which is a point of great importance in a town where water has to be paid for according to the quantity used. It further effects great economy in the use of steam.

For purposes of navigation, it is reported that this new turbine has advantages over any others, in that it has overcome the difficulty of reversing. Up to this time, a vessel equipped with steam turbines could not, it is said, be reversed unless it carried another set of turbines for that particular work. With the new turbine, a boat at full speed can be reversed as easily as with a steam engine.

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Lock and latch N. W. Crandall
Locket T. W. Foster
Locomotive track sander G. M. Schwend
Locomotive turn table R. Fair et al
Loom picker stick check W. E. Sartwell
Loom shed forming mechanism W. Wattie
Loom shedding mechanism B. F. McGuinness
Loom temple C. F. Thompson
Lubricating motors and machinery driven thereby, Device for A. Krebs
Lubricator C. B. & F. W. Hodges
Machinery, Device for protecting the joints between stationary and movable F. W. Krogh
Mail bag catcher O. P. W. Ehrhardt
Mail marking apparatus H. E. Waite
Match box and cigar cutter, Combined F. H. Vick, Jr
Match holder L. Ebnor
Mattress, Sponge rubber M. L. Derick
Measuring and cutting machine, Cloth F. I. Stiles
Measuring device V. B. Frangart
Measuring instrument R. Schierbeck
Measuring instruments centrally in bottles, &c Means for securing A. B. Hohmann
Meat cutter J. W. Simmons
Meats, Curing F. J. Gardner
Metal working machine J. C. Potter et al
Metals from complex ores, Extraction of J. Baxeres de Alzugaray
Mining drill, Coal or rock A. Walker
Mining machine E. P. Rauscher
Miter box L. P. Nichols
Miter cutting machine R. Dunne
Molding machine J. J. Turner et al
Motors, Controlling means for explosion W. J. Lloyd
Movement cure apparatus C. Owens
Mower bar A. C. Rioux
Mowing machine G. W. Newton
Mucilage cup W. Robinson
Muffle J. & A. G. Carter
Mule and twiner, Self acting G. E. Ross
Music sheet perforating apparatus A. L. Hart
Musical instrument E. Lambotte
Musical instruments and players, Pneumatic action for mechanical M. Gaily
Nails, Apparatus for making and simultaneously driving wire M. Schubert
Net Landing J. C. Heritage
Nut lock P. S. Brindle
Nut lock J. Dickason
Nut lock W. R. Rose
Nut lock W. C. Miner
Nut lock, Safety L. D. Frenot
Oil burner D. Coradino
Oil burner regulator W. Chamberlain
Oil separator J. F. Hale
Oiler, Crank pin J. H. Deare
Ore mill W. E. Wild
Ore separator H. J. Burroughs
Packing, Piston C. E. Dawson
Padlock, Permutation F. T. Anderson
Padlock, Permutation D. F. Llewellyn
Panel board H. O. Swoboda
Paper clip E. L. Sibley
Paper fastener inserting apparatus E. L. Sibley
Paper reeler bar G. E. Clegg
Pea hulling machine W. F. Pillmore et al
Peat, Consolidating J. O. Green et al
Penholder guide S. Bacharach
Perambulator J. Ford
Perforating strips, Attachment for machines for C. J. Haubauer
Permanent way R. von Meinong
Photographs and kinematographs, Means for operating synchronously L. Gaumont
Photographic emulsion, Sensitive A. Eichengrün et al
Piano tuning pins, Means for holding G. Ruckstuhl
Picker stick check H. J. Jarry
Picture frame G. Cohn
Picture hanger G. M. Kitzmiller
Pie pan W. C. Normau
Pin sticking machine, Safety F. M. Johnson
Pipe E. Semple
Placket and shirt waist holder, Combined C. J. Bender
Plane handle P. E. Draughon
Planter, Seed C. Sanders
Plate lifter W. H. Sandifur
Plate lifter S. Stitt
Plow irons, Means for forming M. M. Renn
Plow or harrow, Disk W. Somerville
Plow, Subsoil G. W. Johnson
Plumb and level H. Duisen
Poke, Animal J. S. Weathers
Pole or shaft, Vehicle J. S. McKenzie
Pomade can E. L. Pitts
Pompador comb J. I. Rice
Pool ball placer and holder P. Jusche
Post hole digger A. D. Smith
Prepayment apparatus M. D. Compton
Press roll mechanism W. M. Wilkin
Printer's blanket J. E. Rhodes
Printing and embossing machine, Plate W. S. Eaton
Printing or like machines, Feed mechanism for W. Vickery
Printing press, Flat bed cylinder W. S. Hnson
Pinning shears A. S. Boyd
Pulp or compound, Vegetable D. Bickford
Pulp screening machine N. Richard
Purse locking device C. Andresen
Puzzle O. Crittenden
Rail Guard D. F. Vaughan
Rail joint E. D. Boasso
Rail joint W. W. Kercher
Railway construction W. Ferrell
Railway rail chair J. B. Weaver
Railway service safety device E. B. Powers
Railway signal J. K. Leedy
Railway switch slide plate J. Carter
Railway switching and signaling apparatus J. D. Taylor
Railway tie P. H. Kindl
Railway tie A. W. Bascom
Range or stove plate J. Magee
Reamer L. Wertz
Receptacle and attachment plug H. Krantz
Reducing and separating machine E. B. Craven
Reflector, Lamp A. J. Pardridge
Refrigerator and soda water apparatus, Combined D. F. Harris et al
Relay A. Carliss
Reversing device, Electromagnetic J. Riddell
Rivet J. E. Rettig
Roads, &c, Making L. S. Van Westrum
Rotary engine, 3 pats E. F. Taylor
Rudders, Means for locking or unlocking A. J. Maclean
Ruling device J. Hren
Saddle, Harness C. W. Miller
Safe, Provision C. C. Bender et al
Sash fastener J. E. Gibbs
Sash fastener, Window P. H. Page
Sash holder E. Heilmann
Sash weight J. T. Leonard
Saw handle D. W. Solomon
Saw holder D. Rowe
Sawmill off bearing mechanism E. T. Davies
Scenery, &c, of theaters, Machinery for raising and lowering stage E. Lyton
Scrubbing appliance O. F. Swift
Semi-elliptic spring E. Cliff
Separator W. J. Reilly
Sewing machine needle, Self threading J. M. Farmer
Sewing machine spool holder G. W. Coughenour
Sewing machine stitch forming mechanism, Shoe J. L. Kieffer
Shade and globe holder W. C. Homan
Shade holder M. D. Compton
Shade roller bracket J. C. Miller
Shade roller, Window R. Z. Nolan
Sharpening, Disk H. Burford
Sharpening, Drill J. L. Bryson
Shears A. Gutstein
Sheet conveying machine 4 pats T. C. Dexter
Sheet lifting and counting device J. W. Darley, Jr
Sheet metal, Manufacture of A. Paterson
Shepherd's crook H. Frizell
Shingle machine A. P. Finger
Shingling tool E. H. Cokefair
Ship cleaning device E. Cole
Shock loader E. Carroll
Shoe J. A. Mauss
Shoe fastening device G. A. Turnbull
Shoe polisher G. B. Coleman
Shoe rack C. A. Whitcomb
Shoe tree M. W. O'Brien
Sieve and cleaner therefor, Shaking W. D. Gray
Sign, Changeable J. L. Blackmer
Signals, Apparatus for preventing engine drivers running past home or distant T. Cairns
Signals, Electrical apparatus for producing sound C. H. O'Brien
Signaling, Wireless D. Drawbaugh
Slag pot construction, Worm gear operated N. V. Fitts
Snow guard G. F. Folsom
Soap, Making chip W. M. Morse
Soda water apparatus H. A. Hopkins
Soldering machine, Gang J. Dube
Souvenir, Pocket E. Scott
Spark arrester M. H. Hisey
Speed mechanism, Variable C. S. Hode
Spindle brake D. G. Brebeny
Spinning apparatus, Ring A. Lovejoy
Spokeshave J. H. Spear
Spool, Needle cushion M. Duncombe
Spring cushioning device C. P. Byrnes
Spring extension support B. A. Estep
Stamp mill tappet E. I. Morey
Steam and explosion engine, Combined W. D. Gardner
Steam, Apparatus for separating grease or water from W. J. Baker
Steam boiler J. A. Mumford
Steam boiler N. L. Warren
Steam engine A. S. Lineback
Steam generator E. G. Roberts
Steam trap I. F. Hale
Stitch forming mechanism E. C. Henderson
Stock boards, System for operating G. S. Gallagher
Stocking supporter W. M. Vars
Stone sawing machine O. W. A. Ston
Store fixture E. S. Coy
Stove P. I. Coppens
Stoves, System of feeding slow burning E. Engels
Strainer for down spouts, Self cleaning J. J. Harris et al
Straining device, Liquid J. H. Adwen
Streets, &c, Sprinkling L. S. Van Westrum
Streets, Sprinkling L. S. Van Westrum
Sulfuric anhydride, Contact apparatus for the production of W. Hasenbach
Suspender attachment H. G. Geer
Suspenders M. Hynson
Suspenders C. A. Latious
Sweeping machine C. A. Green et al

Syrup J. J. Reed
Tag making machine J. C. Taft
Target trap P. North
Target trap releasing means S. A. Huntley
Teeth and mouth, Casting impressions of the W. M. Dailey
Telephone pole J. H. Purdy
Telephone system, Automatic J. K. Norstrom et al
Telephone transmitter hanger M. Setter
Thermometer case, Antiseptic P. C. Hay
Threshing machine N. G. T. D. & J. M. Ross
Threshing machine R. N. McClanahan
Threshing machine, &c, coupling W. J. Raulolph, Jr
Ticket, Unalterable duplex J. J. McGuirk
Tie rod connection G. G. Guy
Time table appliance and advertising device H. L. Warrens
Tire gage F. Curran
Tire mounting apparatus R. B. Price
Tire, Pneumatic H. E. Irwin
Tire, Rubber vehicle 2 pats R. B. Price
Toaster or broiler G. R. Wilson
Toilet chair G. W. Hessler
Towel F. Clewley
Trace holder B. Johnson
Trace hook, Releasing W. Carter
Train service, Electric M. D. Compton
Transformer C. B. McCurdy
Transmitting intelligence through the natural mediums D. Drawbaugh
Tripod G. F. Smith
Trolley catcher W. C. Young et al
Trolley cords, Automatic check device for S. J. Buckland
Trolley finder E. S. Stitt
Trolley guide, Overhead C. W. Burkhead
Trolley hanger M. M. Wood
Trousers creaser E. C. Chandler
Truck, Pedestal J. M. Hansen
Truck, Railway A. Stucki
Trucks from cars, Device for releasing R. L. Riley
Truss D. T. Foley
Tumbling barrel W. H. Hart
Turbine H. Holzwarth
Turbine bearing H. Holzwarth
Turbine, Elastic fluid J. Wilkinson
Turbine, Steam J. H. de Goede et al
Turbine, Two speed and reversing J. Wilkinson
Tornbuckle, Safety E. H. Cowart
Type writer carriage C. D. Rice
Type writer carriage construction J. Alexander
Type writer paper guide O. C. Kave
Type writer paper release device L. Myers
Type writers or the like, Type bar construction for E. F. Kunath
Type writing machine L. P. Diss
Type writing machine, 2 pats W. C. Farnum
Type writing machine J. W. Schuckers
Type writing machine paper edge guide J. C. McLaughlin
Type writing machine paper guide F. X. Wagner
Type writing machine tabulating mechanism C. N. Fay
Umbrella C. N. Christensen
Umbrella lock, Combination R. B. Waite
Umbrella notch A. M. Peate
Underwaist and garment supporter, Combined L. M. Jones
Upholstry spring top clamp P. F. King
Valve J. W. Nethery
Valve E. Halley et al
Valve J. W. Master
Valve J. Utrilla
Valve, Ball cock C. C. Tozier
Valve, Emergency W. Cooper
Valve, Internal combustion engine 2 pats C. E. Sargent
Valve, Locomotive H. G. Coryell et al
Valve mechanism E. Kromer
Valve mechanism, 2 pats M. Schilde
Valve, Safety C. C. Palmer
Valve, Steam engine reversing E. Kromer
Valves or equivalent means of hydraulic apparatus, Mechanism for operating H. E. Warren
Vehicle C. O. Barnes
Vehicle brake W. D. Brown
Vehicle braking mechanism, Motor J. W. Packard et al
Vehicle step, Folding L. S. Chadwick
Vending machine J. P. Beardslee
Vending machine, Coin controlled M. J. Nash et al
Vise H. E. Reed
Voting machine P. Yoe
Voting machine F. X. St. Louis et al
Wagon, Dumping J. S. Danley
Wagon unloading mechanism M. O. Clark
Wardrobe bracket J. Ternes
Warping machine W. J. Garlick
Washboiler attachment W. J. Bartlett
Water closet attachment P. H. Bacou
Water meter O. Braun
Water pipe mute A. P. Mounier
Water supply apparatus for cattle, poultry, &c G. Hacker
Water tube boiler 2 pats G. E. Turner
Watering apparatus, Poultry house G. Hacker
Weathering apparatus, Stock G. L. Parker
Weather strip W. H. Etter
Welding apparatus 2 pats H. Dicke
Wheelbarrow G. G. Tieman
Whiffletree hook G. D. Hayes
Wick, Lamp J. A. Mosher
Windmill C. O. Sylvester
Wire or cable stretcher M. Huerth et al
Wood working machine feeding device J. R. Thomas et al
Wrench M. Wenger
Wrench W. J. Berryman
Wrench C. S. Kline
Yarn or thread lubricator C. J. Lehman
Yoke P. N. Lear

DESIGNS.

Charm or similar article W. W. Chase

Building block, Artificial 3 pats H. S. Palmer
Collar W. Helbig
Collar 2 pats F. Edelmann
Flower box, Renaissance F. Hinderer
Flower pot, Hanging F. Hinderer
Lamp chimney reflector 2 pats L. Sepulchre
Pencil, Lead E. L. Schmitt
Spoons, forks or similar articles, Handle for 3 pats J. E. Straker, Jr
Suspender button piece W. H. Johnson

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Acid compounds, Making organic W. Bauml
Acid, Making sulfuric N. Heinz et al
Acids, Making organic N. Zelinsky
Air brake operating device G. J. Berbert
Air pressure elevator, Differential G. F. Steedman
Alarm system J. W. Hasburg
Alternator, Inductor L. J. Le Pontois
Alternator, Polyphase magneto L. J. Le Pontois
Aluminium sulfate, Preparing H. F. D. Schwahn
Amusement device W. C. Parsells
Animal catcher and holder J. L. Hauer
Animal trap J. C. Hammer
Audiphone receiver 2 pats H. G. Pape
Automatic coupling J. L. Crisler
Automobile circulating system H. C. Osborn
Axle lubricator, Car J. R. Fleming
Axle mechanism, Driving R. H. White
Balance, Spring S. R. Munson
Bale tie H. De Haven
Band brake F. J. Ball
Banjos, &c, Leg rest for P. H. Foley
Basket making machine, Reissue O. Schleicher
Bath tub C. A. Ricks
Bed spring device, Swinging H. D. Smith
Bedstead, Camp H. R. Wykert
Belt F. Heyl
Bevel and square J. Graff
Binder cover A. Hertze
Binder, Loose leaf E. T. A. Akass
Block signal system, Electric C. W. S. Turner
Boiler J. Collis
Boiler furnace J. H. Foote
Boiler furnace, Steam H. Hyatt et al
Boiler tube caps and their seats, Tool for facing H. F. Weinland
Boilers, Lantern and lantern plug for water tube J. P. Sueddon
Boll weevil machine, Pneumatic W. B. Miller
Bolster J. S. Andrews
Book and index, Balance W. H. Sammons
Book holder L. Block
Books, &c, Telescopic spring post for loose-leafed A. D. Hulquist
Boring machine J. H. Lawles
Bottle H. M. Gibb
Bottle capping apparatus H. Carmichael
Bottle filling machine S. C. Miller
Bottle filling machines, Automatic induction valve for S. C. Miller
Bottle holder E. L. Gatterer
Bottle opener F. B. Horton
Bottle, Water J. F. Goodridge
Bottles, &c, Cap for mucilage W. R. Morse
Box or basket making machine W. J. Kennedy
Braiding carrier H. Janssen
Brake J. A. Field
Brake rod jaw A. Lipschutz
Brake shoe F. W. Sargent
Brake shoes, Making J. R. Cardwell
Brick machine T. S. Crapp et al
Briquetting machine L. Benson et al
Brush, Painting M. C. Cooper
Buggy top joint H. J. Douglas
Buggy top support J. d'Alessandro
Bug, Barrel E. M. Mayer
Hansen burner M. & A. Herskovitz
Button M. B. Ryan
Cabinet, Druggist's prescription J. P. Louquist
Calipers, T-square, and scale, Combined H. B. Cary
Camera W. H. Cooley
Camera, Photographic W. Gundermann
Can body machine J. Black et al
Candlestick, Miner's R. H. Rusden
Candy pulling machine D. T. Igou
Cane and umbrella, Combined J. F. Wilkins
Car coupling C. A. Olson
Car grain door, Freight J. Riley
Car lock and seal J. Scott
Car stop H. Wirsching
Car underframing, Railway G. I. King
Car vestibule M. Power
Car, Vestibule stock J. L. Pennington
Car wheel L. Hayne
Car window dust guard B. Niblack
Car window guard or shield A. D. Cooke
Cart G. B. Donavin et al
Cartridge feeding device M. L. Bristol
Caster wheel J. E. Wood
Centrifugal machine, Water driven J. W. Macfarlane
Chain, Link E. A. Uehling
Chair H. W. Bolens
Chair fan attachment, Rocking W. C. Lagdale et al
Chandelier, Extensible W. H. Kerr
Check holder, Miner's D. P. Adams
Chuck, Rock drilling machine J. Hodge
Chute device, Coal S. B. Peck
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Cigar wrapper cutter and rolling tables, Pressure rolls for I. Liberman
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Clock W. Rausch
Cloth fodder H. Nelson
Clothes line holder G. H. De Vine et al

- Clothes reel S. Tillson
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Cocoa mill P. Faust
Coffee urn A. & J. Phillips
Coin carrier or mailer. Magic P. S. Short et al
Coke from ovens. Machine for discharging J. Kershgens
Coke handling apparatus C. W. Hunt
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Collar. Pneumatic horse E. L. Sill
Composition of matter M. A. Dillard
Compound engine R. H. White
Compressometer W. J. Tretch
Concrete piles. Forming F. Shuman
Conducting cord. Flexible H. B. Holmes
Conveyer J. A. Hentz
Cooker. Steam C. H. Burton
Core box cutter F. E. Thoms
Coupling W. H. Wallace
Crane propulsion device R. Wilke
Crate. Bottle W. W. Price
Crate. Egg E. N. Paul
Cream separator E. & B. Starch
Crimped sheet P. Hinkel
Cross arm brace F. B. Cook
Cross head R. H. White
Cultivator S. M. Adams
Cultivator J. Nagel
Cupel making machine A. C. Calkins
Currycomb H. E. Ewart
Curtain fixture F. I. Knighton
Curtain pole P. S. Truxal
Curtain pole tip G. H. Atkins
Curtain rod fixture H. H. Meyer
Cycle. Motor G. C. Wilkinsou
Decorticating machine A. D. Estienne
Dental plate mold O. E. Driscoll
Desk and seat. Adjustable school W. L. Starkey
Desk, book-rack, and easel. Combination E. M. Miller
Desk for hotel registers G. P. Rose, Jr
Disinfecting device F. A. Martin
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Draft equalizer F. R. Goode
Draft equalizer J. Farmer
Drawing tool. Combination P. Neukirchen
Dredge O. K. Hogen
Drying apparatus for wood, &c. J. Keith et al
Drilling and boring machines. Bed fastening for horizontal spindle G. H. Smith
Driving mechanism J. F. Kay
Dust pan W. H. Hills
Dyestuff G. Rowland
Dynamo brush M. Bunzig
Egg tester P. B. Southworth
Electric cord adjuster J. E. Masterson
Electric meter 4 pats. T. Duncan
Electrical illuminating device for show windows J. H. Goehst
Electrical receptacle P. H. Fielding
Elevator J. Rice
Elevator safety apparatus M. Hanford
Embossing press C. E. Dellenbarger et al
Embroidered fabric A. Burgess
End cell switch J. W. Achard
End gate J. W. Schirmer
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Engine tender. Traction W. S. Kelley
Engines. Cooling attachment for internal combustion J. W. Sutton
Engines. Producing sparks in the cylinders of internal combustion L. J. Le Poitots
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Fan. Oscillating electric J. Amrom
Fan structure. Ventilating W. Clifford
Farm gate T. J. Ryan
Fastener device W. C. Stange
Feed mechanism. Automatic vacuum and suction A. D. Coleman
Feed water heater W. A. McKee
Feed water heaters. Device for controlling the supply of steam to M. P. Osbourn
Fence S. A. Odell
Fence post S. C. Silver
Fence post J. N. Erixon
Filter O. Loeffler
Filter H. G. Sweeney
Fire door closing device H. L. Cochran
Fire extinguisher H. C. Shaw
Fire extinguishers. Valve for automatic W. A. Goldthwait
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Flooring of blocks of wood. Machine for making mosaic J. Wehinger
Flue or tube cutter J. Ulrich
Folding box A. J. Bacon
Fruit bleacher J. W. Kimmons
Fruit pitter S. H. Shelley
Fumigator W. B. Cunningham
Furnace W. H. Gregg
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Gabion C. Kerr
Gage J. J. Butterworth
Garment supporting means C. W. Mesick
Gas engine A. G. Ronan
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Gate A. A. Bradbury
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Gate attachment A. Skellenger
Gear. Driving R. Hundhausen
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Geodetical instrument H. Grubb
Glandular extractive compound J. Takamine
Glass forming apparatus. Plate H. J. Hays
Glass with wire embedded therein. Making J. W. Paxton
Glass. Working H. J. Hays
Glove W. B. Phillips
Glove gauntlet W. C. Graichen
Gold separator. Reciprocatory J. P. Schmitz
Governing mechanism for internal combustion engines W. J. McVicker
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Grain binder C. Maul
Grain conveyer J. E. Camp
Grain. Conveyer mechanism for handling E. M. Kramer
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Grain, &c. Mill for rolling or grinding E. Brown
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Hairpins. Apparatus for making D. H. Hayward
Hammer. Claw E. A. Ashland
Hanger G. Nissenson
Hay and stock rack J. H. Anderson
Hay rack attachment J. J. Acton
Heat retainer E. C. Kirk
Heater A. von Chigor
Heating water by steam. Apparatus for W. G. F. Steimetz
Heel protector M. M. West
Helmet J. J. Curtis
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Hoisting mechanism. Safety and signaling device for W. N. Dickinson, Jr
Hoops to casks or barrels. Machine for applying bilge E. C. Torschmidt
Horse-hoe ice creeper C. H. Rockefeller
Hose coupling P. C. O'teen
Hose supporter E. N. Humphrey
Hot air and hot water furnace L. A. Steyne
Hulling and scouring machine F. A. Loeschner
Hydrocarbon burner G. W. Drasil
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Ice making machine R. F. Learned
Ice shaving machine F. J. Reinhold
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Knitting machine bur wheel support R. W. Gormly
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Lamp R. P. Habel
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Microphone P. Germain
Microscope and case therefor. Portable C. F. Dieckmann
Mine ventilation system and apparatus W. Clifford
Miner's tool A. V. Des Moines
Mining machine bit. Coal R. McKinney
Mirror support J. M. Conroy
Miter box S. D. Hoy
Miter cutting machine arm adjustment R. Wales
Molding apparatus. Power actuated J. G. Johnston
Molding cope W. C. Norcross
Mop and wringer. Combined E. Hilker
Mower. Lawn C. E. Foster
Mowing machine. Automatic E. A. Johnston
Musical instrument B. R. Kiessig
Musical instrument controlling mechanism. Automatic A. Keller
Musical instruments. Attachment for expression or accent controlling mechanisms for mechanical R. W. Pain
Navigator's position indicator J. B. Smith
Necktie or ribbon clasp J. J. O'Callaghan
Nozzle. Sprinkler J. D. Ross
Nut lock F. L. McCulloch
Nut lock J. D. Brent
Observation wheel D. W. Blair
Oil burner J. L. Smith
Oil separator M. P. Osbourn
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Organ. Pipe H. F. Hammer
Ornamental comb. Adjustable W. J. Hines
Package carrier C. Lederman
Paper drying machine. Wall L. H. McCartney
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Paper reel J. Sr. & F. H. Hoberg
Paper trimmer W. M. Keeling
Pedal G. Merritt
Pen and pencil holder and calendar. Combination H. J. Mellon
Pelt stretcher F. M. B. Bowman
Pencil case A. J. Paroubek
Pencil. Copying E. Markovits
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Phonograph table A. A. Bergman
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Piling. Interlocking metal sheet G. E. Nye
Pipe wrench O. F. Helfritz
Pipe wrench T. W. Hardin
Planter. Corn S. Meiners
Planter. Cotton L. C. Ellison
Planter. Cotton I. J. Willcox
Planter. Seed H. S. Butler
Planters. Reversible automatic marker for L. P. McVay
Planting device. Seed H. S. Dyer
Plastic materials. Dye for producing articles from L. Steinberger
Plate handling machine. 3 pats. E. Miles
Platen. Adjustable G. W. Donning
Plug. Attachment P. H. Fielding
Policeman's mace P. O. Evensen
Potato digger J. Johnson
Poultry house J. J. Edgerton
Power transmission. Sectional wheel for J. H. Fogarty
Primer. Combined percussion and electric T. G. Bennett et al
Printing and folding machine W. Scott
Printing machine H. A. W. Wood
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Printing plates. Producing duplicate F. & A. Leslie
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Propeller E. D. Hamilton
Protractor H. Woodborough
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Pulley for threshing machines. Paper cylinder O. Berg
Pulp press. Wood R. E. Boschert
Pump. Beer J. Grueninger
Pump. Centrifugal L. Look
Pump for switching mechanisms. Electric W. J. Bell
Pumps. Electrical apparatus for registering the discharge of liquids by H. J. S. Cassal
Pumping apparatus J. E. Smith
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Rag dusting machine W. H. Sanburn
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Railway block system J. Morton
Railway brake head and shoe therefor W. Armbrust
Railway switch J. T. Evans
Railway switch W. K. Smith
Railway switch. Electric H. H. Chandler
Railway tie A. M. Bowman
Railway tie J. G. Shuster
Railway track laying apparatus (G. F. H. Hicks
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Railways. Automatic signaling system for electric H. B. Snell
Razor. Safety J. Biggin
Razor strop dresser. 2 pats. T. J. Fords
Reading stand A. Howe
Reamer J. E. S. Taylor
Receptacle W. Weise
Rifle cleaner W. C. Buckelew
Rifle sight M. E. Sutherland
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Rocket T. Lloyd
Rolling mill R. D. York
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Rubber like gum. 2 pats. M. G. Brownell
Rubber like material R. A. Leigh
Rubber working machine A. N. Hood
Sand drier. Portable P. C. Brennan
Sand screen and mixer. Combined H. G. Boughton
Sander. Pneumatic I. P. Carnes
Sash. Window I. W. Emerson
Saw setting and sharpening machine R. McMorland
Saw table gage C. A. Nollin
Scale. Weighing M. Triner
Screw driver G. E. Wood
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Seesaw amusement apparatus W. H. Gilman
Sewing machine R. G. Woodward
Sewing machine. Buttonhole D. Noble
Sewing machine feeding mechanism. Book R. Mitchell
Sewing machine hand lever attachment J. W. Wheeler
Sewing machines. Trimming cutter attachment for zigzag H. A. Klemm
Shade holder H. Hubbell
Shade roller bracket jack M. Schwab
Shock binder J. W. Smith
Sifter. Flour A. C. Barler
Signaling apparatus R. B. Kernohan
Signaling by electromagnetic waves R. A. Fessenden
Signaling. Selective R. A. Fessenden
Sketching outfit A. R. Cobb
Skylight W. Smith
Slub detector S. W. Wardwell
Smoking pipe T. Tomlinson
Snow disposal system J. C. Marriott
Sound recording machines. Removable turn table for E. R. Johnson
Spectacles. Rim J. C. Anderson
Spark arrester, extinguisher and discharger J. W. Heaton
Spindle driving bands. Mechanism for guiding and applying tension to J. Boyd
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Spinning machine L. Dugauquier
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Spool holder and case M. Maas et al
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Stamp mills, &c. Tappet for the shafts or ore P. C. Kelly
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Steam boiler C. E. Chapman
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Storage bin J. A. Jamieson
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Supporting frame or trellis A. Corts
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Switchboard A. Stromberg
Switchboard system. Multiple W. M. Davis
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Teaching singing. Apparatus for A. Gusinde
Telegraph system. Electric C. Adams-Randall
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Telephone or telegraph system R. Hamilton
Telephone selecting device W. D. Watkins
Telephone signaling mechanism O. O. Lee
Telephone systems. Means for synchronizing the instruments of H. Redmon et al
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Thill coupling C. S. Lehman
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Thread holding and cutting attachment for spools D. C. Laird
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Tile R. McCarril
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Timber treating process P. F. Dudson
Tip cat J. A. Astarita
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Tongue switch G. M. Erwin
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Train lighting system. Electric D. C. Henry
Train markers. Automatic wind break for E. M. Rife
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Tunneling apparatus C. W. Smith
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Type writer. 2 pats. H. Moya
Type writer attachment L. H. Weston
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Type writing machine C. E. Smith
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Voice pipe mouthpiece T. W. Battin
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Warping and beaming machine W. C. Keyworth
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Water closets, &c. Flushing apparatus for J. H. Smith
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Wire receptacles. Apparatus for making articulated or open work C. Azary
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 Copper pouring spoon.....B. H. Bennetts
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 Corn husking machine feeder.....A. Yates
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 Drying and calcining kiln.....C. E. Pickett
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 Drilling machine shot feed.....W. S. Eaton
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 Electrodynamical generator.....G. M. Pelton
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 Elevator door locked controller.....C. O. Harker
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 Embossing machine supporting roller.....A. Breseman
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 Planter seeding attachment. Corn.....G. P. Oates
 Pliers.....W. A. Bernard
 Pliers jaws.....W. G. G. Weidinger
 Plow.....G. L. Bradley
 Plow.....G. L. Edgerton
 Plow harrow attachment.....J. Scherer
 Plumb and level.....G. C. Brown
 Plumb and level.....C. H. Craven
 Pole or post base.....J. McIntosh
 Press.....G. H. Jones
 Presses or the like. Fluid system for.....W. M. Holmes
 Printer's chase attachment.....L. G. Conly
 Printing and folding machine.....W. Scott
 Printing apparatus. Rotary stencil.....S. Brown
 Printing block.....W. M. Rockstroh
 Printing forms on cylindrical surfaces. Pro-
 ducing intaglio.....2 pats.....G. F. & J. W. McIndoe
 Printing. Planographic.....G. R. Cornwall
 Printing. Preparing color plates for.....C. N. Smith
 Projectile.....J. R. Jacobs
 Projectile. Explosive.....J. F. Meigs et al
 Propeller. Fish tail.....Z. von Limbeck
 Pump.....A. J. Miksch
 Pump.....F. E. Ten Eyck
 Pump.....J. Hahn
 Pump driving mechanism.....J. C. Whitmer
 Pump. Power.....H. M. Chase
 Pump. Steam.....F. B. Corey
 Pump. Vertical plunger sinking.....E. M. Coryell
 Puzzle.....O. L. Hubbard
 Puzzle.....G. L. Mott
 Puzzle.....D. L. Munro
 Puzzle-lock.....H. Bruck
 Rack.....C. D. Lyon
 Rail joint.....P. Holbrook
 Rail joint.....B. C. Rowell
 Rail joint.....J. M. Staples
 Rail joint.....W. C. Burgum
 Rails. Renewing traction.....D. H. Leitz
 Railway cross tie.....H. D. Leeking et al
 Railway gate. Automatic.....C. W. Curd
 Railway signal.....T. Bruck
 Railway tie and chair.....J. J. Phillips
 Railway trains. System for preventing collis-
 ions, accidents, &c., by.....F. Schmitt
 Railways and switching systems embodying
 same. Combined third and traction rail for
 electric.....E. C. Morgan
 Railways. Combined third and traction rail
 for electric.....E. C. Morgan
 Railways. Contact device for electrically pro-
 pelled.....H. Berthoud
 Ram. Hydraulic.....G. H. Earle, Jr et al
 Refrigerator.....F. M. Vanneman
 Refrigerator drip pan alarm.....S. Lapointe
 Register.....J. O. Morris
 Register.....F. R. Beal
 Rheostat.....J. C. Barclay
 Rivet setting machine.....A. T. Maenche
 Road making and repairing machine.....A. Cameron
 Rolling mill.....J. Krohn
 Rope grab.....D. H. Lentz
 Rope grab.....J. Carney
 Rotary engine.....J. J. Horan
 Rotary engine.....A. Groves, Sr
 Rotary engine.....T. D. J. C. & H. A. Prescott
 Rotary engine.....F. P. & B. F. Uhrig
 Rotary engine.....A. F. Ford
 Saddle. Riding.....P. R. Stern
 Salt receptacle.....C. E. Long
 Salve. Making a.....J. F. Huefner
 Sand bars. Means for removing.....E. H. Allman
 Saw filer.....J. M. Holladay
 Saw swaging and filing gage.....S. J. Galloway
 Sawing mining timbers. Machine for.....D. W. Edwards
 Scale. Price or money weight.....A. R. Beal
 Scissors swage.....R. Miller
 Screw or bolt head lock.....G. W. Kennard
 Screw thread trimming tool.....W. E. Corkrey
 Seal. Bottle.....W. S. Dorman
 Seam ripper.....M. J. Bacon
 Seating bench.....J. C. Wolf
 Seed delinier. Cotton.....R. Derderney
 Separating lump material.....A. Langerfeld
 Separator.....T. H. Ray
 Separator.....A. Langerfeld
 Setting machine.....E. L. Pupke
 Shaft coupling.....D. S. Sinclair
 Sharpening device.....F. S. Rich
 Sheet metal can.....A. T. Kates
 Shelf structure. Knockdown expandable.....A. Dannenberg
 Shingle holder.....I. D. Adams
 Shipping device. Controlled.....J. O. McKean
 Shock former.....J. F. Wheeler
 Shoe.....C. K. Sharood
 Shoe fastener.....G. W. Wise
 Show case.....L. J. Baker et al
 Sight. Telescopic.....E. M. Hewlett
 Sign and bird house. Combined.....I. Mason
 Sled. Bob.....J. H. Anderson
 Small arm. Recoil loading.....G. Luger
 Smoke consuming furnace.....J. H. Hawke
 Smokeless boiler.....E. Chaquette
 Soap molding apparatus.....F. C. Inrer et al
 Soda water apparatus.....C. A. Geddes
 Soda water apparatus.....F. H. Lippincott
 Spectacle temple.....O. Lavallee
 Speed changer hanger.....E. J. Lees et al
 Spike puller.....F. W. & F. A. Gerlach et al
 Spinning or twisting machine thread guide
 support.....L. T. Houghton
 Spout.....E. C. Staundinger
 Spraying spar.....W. H. Owen
 Spring clip.....3 pats.....G. W. McGill

Stamp mill W. A. Merralls
 Stave shaping machine A. L. Shaw
 Stay bolt. Flexible J. B. Tate
 Steam. Apparatus for supplying cities with W. C. Andrews
 Steam or gas engine O. B. Thorson
 Steam. Superheating S. A. Reeve
 Steam trap C. A. Dunham
 Steel concrete construction, &c J. S. Metcalf
 Steering gear H. W. Hoover
 Stone sawing machine. 3 pats. G. D. Hunter
 Stove frame. Vapor I. Kinsey
 Stovepipe fastener E. Hanmer
 Stringed instrument plectrum D. W. Barnes
 Stringed instrument tuning attachment E. Sprötte
 Stuffing box W. T. Giles
 Superheating system S. A. Reeve
 Swing fan attachment J. E. Welin
 Swing. Lawn C. G. & H. H. McLaughlin
 Talking machine sound box E. R. Johnson
 Tank filling alarm C. Maul
 Tap. Bottle reissue J. A. Sherrard
 Teaching device. Penmanship F. C. Young
 Telegraph apparatus. Electric A. Falcone
 Telephone S. C. Houghton
 Telephone instrument. Portable or table L. M. Ericsson
 Telephone jack field L. M. Ericsson
 Telephone or microphone casing P. Hardegen
 Telephone repeater M. Gally
 Telephone toll apparatus. 2 pats. G. A. Long
 Textile webs. Machinery for the production of W. G. Stewart
 Thermometer case P. C. Kellett
 Thill or tongue support L. A. Scidmore
 Thresher and separator P. Hofmann
 Threshing machine J. A. Beam
 Ticket holding device J. H. McGuirk
 Tile and tile setting J. H. Munro
 Tire inflating apparatus E. Girard
 Tire making machine. Pneumatic U. P. Smith
 Tire. Vehicle H. E. Irwin
 Tire. Vehicle wheel H. A. Palmer
 Tire. Vehicle wheel J. A. Swinehart
 Tires. Apparatus for the manufacture of vehicle M. Nirdlinger
 Toilet kit A. M. Schneider
 Tongs or clamp P. A. Orth
 Tool handle I. S. Davidson
 Torpedo fork E. H. Frank et al
 Toy A. P. Ward
 Track sanding device J. H. Haulon
 Traction strap H. P. Maxim
 Train order and signaling system. Electric J. C. Gleason
 Trolley A. C. Calderwood
 Trolley A. S. Deem
 Trolley automatic releasing device. Safety A. C. Wolfe
 Trolley. Electric car W. A. Daggett
 Trolley replacer F. A. Nolan
 Truck W. G. Price
 Truck. Car W. G. Price
 Truck. Rocker side bearing J. C. Wands
 Truck. Roller side bearing J. C. Wands
 Trunk. Wardrobe 2 pats. A. D. Seaman
 Truss for ruptures B. J. Douds
 Turbine governing means. Elastic fluid J. Wilkinson
 Turbine governing mechanism 2 pats. J. Wilkinson
 Turbine supply nozzle C. Weichelt
 Twisting frame stop motion C. Whitaker
 Type writer aligner J. Alexander
 Type writer aligning mechanism J. Alexander
 Typewriter. Polychrome C. A. Joerissen et al
 Type writer type bar segment C. W. Howell, Jr
 Type writing and tabulating machine H. Jarvis et al
 Type writing machine H. S. Dukes et al
 Type writing machine. Stenographic A. B. Saliger
 Type writing machines. Work handling mechanism for H. S. Dukes et al
 Upholstering. Casket A. J. Cross
 Valve C. L. Turner
 Valve cam movement C. Rogers
 Valve. Combined steam and water L. A. Parker et al
 Valve reseating machine. Gate F. L. Smith
 Valve seat planer. Portable W. H. Bean
 Valve W. H. Stratton
 Variator W. C. Andrews
 Vehicle body loop L. Crise
 Vehicle driving and steering mechanism. Motor E. L. Russell
 Vehicle. Electrically propelled. H. P. Maxim
 Vehicle. Motor 2 pats. W. J. G. Lane
 Vehicle spring wheel A. G. Ramage et al
 Vehicle steering connection. Motor E. L. Russell
 Vehicle step attachment J. M. Vaughan
 Velocipedes or road motor vehicles. Variable gearing for J. Archer
 Velocity meter G. Dettmar
 Vending machine Y. O. Caldwell et al
 Voting table and ballot box L. W. Sprague
 Wagon body. Folding F. B. McMurray
 Wagon box fastener W. H. Dulaney
 Wagon brake 2 pats. H. H. Piper
 Wagon. Coal A. C. Pannepacker
 Wagon. Dumping A. Cameron
 Wagon. Speed J. P. Faber
 Wardrobe and bed. Combined S. Austin
 Wardrobe. Folding J. F. Hayes
 Wardrobe. Portable A. Magui et al
 Washstand T. Widdop
 Washer D. Kuukle
 Watch holder A. M. & E. S. Church
 Watch mainspring E. F. O. Klein
 Waterway. Pleasure A. Pusterla
 Weeder tooth E. G. & A. E. Quickel
 Weighing machine E. H. Cook
 Welding apparatus H. Dicke
 Well drilling machine D. W. Saunders
 Wheel guard J. B. Howard
 Whiffletree hook C. E. Jones
 Wick. Lamp A. H. Nelson
 Windmill C. A. Wright
 Windmill W. A. Butler
 Window G. Kabureck
 Window H. E. Brown
 Window adjusting device A. F. Enquist
 Window. Antiheat radiating F. Voigtman et al
 Window frame or sash H. Romander
 Window screen W. R. Cochran, Jr
 Window screen W. A. Cassidy
 Woven fabric C. H. L. Hanson

Wrapping machine. Package D. F. Bremner, Jr
 Wrench A. De Vilbiss, Jr
 Wrench F. D. Harris
 Wrench A. Magnuson
 Yarn guide holding mechanism J. E. Prest

DESIGNS.

Cash register cabinet or casing E. Ringold
 Chain. Watch J. Hama
 Dish J. Maddock
 Monument E. M. Wolff
 Spoons, forks, or similar articles. Handle for 3 pats. E. Crees et al
 Tableware. Open work border for metallic A. Steffin

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MECHANICAL PATENTS.

Air and gas regulating apparatus E. A. Hall
 Air brake controller 2 pats. W. H. Scott
 Alloys. Electrical manufacture of iron G. Gin
 Antiseptic attachment for telephone mouthpieces W. M. English et al
 Anger. Tubular G. D. & J. H. Shaul
 Autoharp sliding chord bar D. Ford
 Automatic brake D. L. Ainsley
 Automatic dropper W. Obermeier
 Bag fastener C. Guy
 Baker's peel G. J. Bohn
 Baling press G. W. Robbarts
 Band cutter and feeder knife G. W. Parsons
 Banjo G. C. Furbershaw
 Bank safety appliance W. S. Kinsley
 Bath tub seat G. W. Harbour
 Battery stopper A. Muller
 Bed bottom W. Shanoun
 Bed bottom. Spring C. P. Brouette
 Bed bottom. Spring J. G. Venable, Sr
 Bed couch G. M. Kim
 Bed or cushion B. T. Milliken
 Bed partition J. E. & J. P. Smith
 Bed, sofa, and chair. Combination H. Lehrer
 Bed. Spring J. F. Sullivan
 Beds. Leaf support for sofa O. R. Hunt
 Beet blocker and cultivator C. H. Derham
 Belt. Link M. O. Reeves
 Belt or apron. Traveling F. D. Mersey
 Bicycle attachment W. H. Bradley
 Binder frame L. A. Jones
 Binder frame. Loose leaf A. H. Lorenz
 Bit stock J. Foit
 Blast furnace J. W. Pack
 Blowing engine E. Reynolds
 Boats. Ballast compartment for submarine S. Lake
 Boiler circulating system. Steam W. J. MacDonald
 Boiler tube heat circulator J. Philp
 Bookbinding G. H. Day
 Book leaf fastener W. C. Goss
 Book. Manifold sales L. G. Whitney
 Bottle closing device F. B. Cary
 Bottle. Non-refillable S. W. Ludlow
 Bottle. Non-refillable M. G. Deane
 Bottling machine. Liquid A. Schneider
 Box fastener H. L. Jones
 Box fastener F. Moellenbrock
 Brake J. A. & C. Mays
 Braking mechanism J. B. Mahana
 Bread cutting machine O. Bernard
 Brick handling truck W. Miller
 Brooder M. A. Mills
 Brush. Stove polishing I. Rausch
 Burglar alarm F. C. Robinson et al
 Butter mold J. W. Easton
 Button. Metallic G. J. Capewell
 Caliper attachment. Micrometer W. D. Turner
 Calking tool. Pneumatic J. J. Tynan et al
 Can manufacturing machine D. L. Eustice
 Car brake H. T. Brown
 Car brake. Emergency W. Woltz
 Car coupling V. Simecek
 Car coupling S. B. Price
 Car doors. Locking latch for coal A. T. Correll
 Car. Dump J. Shelton
 Car. Railway C. Vanderbilt
 Car steering gear. Motor W. J. Iden
 Car structural beam. Railway A. M. Sullivan et al
 Cars. Automatic blocking, releasing, and dumping system for tram C. J. Ringstrom
 Carbonated liquid dispensing apparatus T. Hentgen
 Carbureter T. T. Weber
 Card feeding mechanism E. V. Bates
 Card holding device E. N. Heath
 Carriage. Baby L. V. Thompson
 Cartridge belt filling machines. Feed device for J. Ramsay et al
 Cash register T. Carroll
 Cash register W. H. Muzzy
 Cementing machine W. A. Knipe
 Chair seat sections, &c. Joint for J. B. Hough
 Chalking device. Line J. F. McCormick
 Chatelaine bag L. E. Zedgar
 Cigar band C. F. Zenker
 Cigar tip cutter E. Walker
 Cigarette W. C. Doscher
 Clay, shale, &c. into various patterns or articles. Machine for stamping or shaping plastic E. C. Hoelsche
 Clock. Electric G. S. Tiffany
 Clock pendulum. Torsional G. S. Tiffany
 Clutch. Magnetic A. C. Eastwood
 Coal burning apparatus. Soft R. Baker
 Cock fastener. Basin J. H. Glauber
 Cock or faucet. Automatically closing C. Douenne
 Coin detector for coin actuated devices B. M. Davis
 Coke oven charging machine S. T. & C. H. Wellman et al
 Cold air chamber or refrigerator L. Mantell et al
 Comb L. E. Edgar
 Commutator for telephonic or other circuits C. H. Proti
 Concrete piles. Apparatus for use in making W. C. Lyon
 Concrete piles. Making W. C. Lyon
 Conveyer T. McDonald et al

Conveyer. Portable 2 pats. W. L. McCabe
 Conveyers. Feeding attachment for pneumatic E. T. Souendriker
 Cooking machine. Dough C. Betz et al
 Cooking utensil H. M. Horine
 Corn huskers and shredders. Spreading roll for J. H. Pitkin
 Cotton chopper and cultivator. Combined N. Langford
 Cow tail holder P. Young
 Cracker case W. T. Magness
 Crib C. Hollis
 Cultivator J. R. Jones
 Cultivator W. L. Eddy
 Current distribution. System of alternating E. R. Gill
 Current transformation. Alternating M. Hutin et al
 Current transformation. System of alternating M. Hutin et al
 Curtain fixture J. W. Paterson
 Curtain pole A. R. Harmany
 Cut off. Automatic water gauge J. H. Cunningham
 Cutting machine W. Dietmann
 Damper J. E. Frenning
 Desk. Portable T. Cram
 Distillation apparatus. Wood C. M. Palmer
 Domestic boiler H. A. Miller
 Door check J. C. Moore
 Door check and closer J. Bardsley
 Door guard B. D. Jones
 Door sealer F. E. Wiesner
 Door spring J. C. Moore
 Dough break W. H. Scott
 Dress shield C. A. Pienkowsky
 Drilling machine W. F. Koepen
 Drilling machine. Automatic multiple F. J. Nutting
 Drum C. A. Stromberg
 Drying line holder O. A. Pfeiffer
 Dyeing frame. Portable J. R. Mauran
 Dye and making same. Anthracene H. Weltz
 Dye and making same. Azo P. Julius et al
 Electric cable fault locator D. E. Wiseman
 Electric machine N. A. Christensen
 Electric motor D. P. Burdon
 Electric signal J. E. Feller
 Electric snap switch G. W. Hart
 Electric switch 3 pats. N. Marshall
 Electric wires in buildings. Junction box for B. W. Allen
 Electrical machine brush holder W. H. Foot
 Electrodes. Preparing G. J. Atkins
 Electromagnet W. D. Gregory
 Engine J. A. Decher
 Engine muffler. Gasoline R. W. Brockway et al
 Engine regulating device M. Muel
 Engines. Gas engine attachment for steam H. B. Nicodemus
 Engines. Means for cylinder lubrication of internal combustion A. P. Brush
 Envelop J. A. Walsh
 Envelop A. Bushnell, Jr
 Envelop P. Davalos
 Envelop fastener A. A. Rheutan
 Envelop. Twin A. G. Jones
 Erasers. Machine for cleaning blackboard J. A. Jones
 Exhibitor. Changeable A. & A. C. Bechtold
 Fabric W. S. Sillocks
 Fastening and suspension device E. M. Lewis
 Fastening device. Metal G. C. Wyland
 Faucet. Water M. Pitt
 Feed bag T. L. Hawkins
 Feed water. Purifying J. B. L. Destombes
 Fence W. C. Reinmiller
 Fence post M. E. Lerch
 Fence post V. E. Randall
 Fence post 2 pats. J. Scheidler
 Fence post. Plastic J. C. Brooks
 File. Bill G. L. Burgess
 Filter. Water S. E. Foreman et al
 Filtering material S. G. Derham
 Fire alarm or temperature annunciator J. A. Olson
 Fire escape J. M. Stafford
 Fire extinguisher G. A. Anderson
 Fire extinguishing apparatus. Automatic H. F. Maxim
 Fire kindler R. Hager
 Firearm A. Fyrborg
 Fireproof blind E. H. McCloud
 Fireproof covering for columns, &c A. C. A. Himmelwright
 Fireproofing and insulating structure O. F. Zahn
 Fish hook B. S. Scott
 Fishpole line eye attachment F. W. Roth
 Flooring end joint M. A. Hayward
 Floors, &c. Appliance for cleansing J. S. Stewart-Wallace
 Flower bulbs are grown. Fitting for vessels in which A. Simpson
 Flowers, vines, &c. Machine for manufacturing artificial H. L. McKain
 Flush tank apparatus J. H. Seager et al
 Folding bracket L. W. Tucker
 Food chopper L. T. Snow et al
 Fruit picker F. C. Howell
 Fur skins. Machine for removing hairs from 2 pats. T. C. Mills
 Furnaces. Device for aiding combustion in boiler E. R. Lewis
 Furnaces, &c. Reversing valve for regenerative C. G. Atha
 Game apparatus S. E. Wharton
 Game apparatus C. W. Wing
 Game apparatus. Check controlled G. W. MacKenzie
 Game counter. Combination C. C. Neffger
 Garment fastener C. A. Bryant
 Garment supporter J. J. Buchanan
 Gas burner C. T. Fuller
 Gas burner W. Kohn
 Gas engine D. Glasby
 Gas engine H. Richter
 Gas fired boiler A. Sahlin
 Gas fixture J. Wunder, Jr
 Gas mixer A. A. Gohu
 Gases in liquids to keep alive aquatic animals and water plants. Dissolving F. Kaltenecker et al
 Gate fastener C. H. Spencer
 Gear lock C. Percy, Jr
 Gearing. Variable speed transmission T. C. Churchill
 Glider tool W. H. Coe
 Glass articles of circular cross section. Manufacture of D. A. Ripley
 Glass jar R. I. Sherman

Glass plates together. Corner clamp for securing H. Schiefel
 Glove R. G. Rate et al
 Governing mechanism P. D. Ball et al
 Governor. Automatic friction V. G. Appl
 Grading and scraping machine. Road J. H. Osten
 Grain drill G. L. Roly
 Grinding machine G. J. & H. G. Pelstring
 Guns. Cartridge ejector for breakdown O. W. Ringquist
 Guns. Hinge pin for breakdown O. F. Mossoerg
 Hair parting device F. H. Wood
 Hair waving device J. P. Bonnet
 Hanger E. Flagler
 Harness terret J. G. Way
 Harrow jack N. W. Thompson
 Harvester. Grain binding R. L. Parsons
 Hat E. M. Hacker
 Hat fastener J. Kaiser
 Hay rake. Horse W. A. & S. S. Cavett
 Hay tedder G. L. Roby
 Heater and purifier R. M. Ross
 Heating and ventilating apparatus W. M. Ferry
 Heating tank L. J. Grubitz
 Hide splitting machine. Raw C. H. Pell
 Hitching post T. J. Fox
 Hitching weight holder G. M. Albee
 Hoisting mechanism H. Aumond
 Hoof pad G. H. Clark
 Horse blanket J. J. Foglesong
 Horse breaking device J. G. Bump
 Horse detacher J. Pearson
 Horseshoe creeper W. J. Stewart
 Hose supporter W. E. Kink
 Hub. Vehicle reissue E. Sendeibach
 Hydraulic apparatus W. Asfalck
 Hydraulic main E. N. Trump
 Hydrocarbon burner W. H. Thornley
 Hydrocarbon burner G. W. Arper
 Ice cream cutter or scraper W. C. Betts
 Ice table J. Kanaz
 Ink distributor M. E. Mott
 Insect destroyer N. Smith
 Insect trap J. Lump et al
 Insulator pin J. H. Bullard
 Interest table P. E. Johannsen
 Iron or steel. Cleansing and improving the quality of F. C. Weber
 Jar and closure therefor F. H. Gibson
 Journal box J. W. Stephenson
 Kaleidoscope. Illuminated T. R. Johnson
 Kneading device A. A. Stuart
 Ladder raising or lowering machine E. F. Dahill et al
 Lapidist's facet cutting instrument F. A. Marcher
 Lamp. Electric C. P. Steinmetz
 Lamp extension fixture. Incandescent electric C. M. Pitel
 Lamp hanger. Extension. 2 pats. J. Bystrom
 Lamp. Incandescent electric H. M. Taylor
 Lamp. Inverted incandescent gas T. B. Smith
 Last support E. O. Krentler
 Latch H. F. Keil
 Lathing. Machine for making metallic P. Kuhn
 Lawn sprinkler E. Sutherland
 Linoleum floor cloth, &c. Apparatus for the manufacture of mosaic M. B. Nairn
 Linotype machine alarm attachment G. L. Venable
 Lock C. E. Long et al
 Lock G. W. Caswell
 Loom beating up motion H. A. Bond
 Loom cut signal or indicator W. Haynes
 Loom filling fork E. S. Stimpson
 Loom. Filling replenishing E. S. Stimpson
 Loom friction let off mechanism J. T. Meats
 Loom selvage forming attachment E. G. Roder
 Loom shuttle H. Cote
 Loom warp stop motion C. H. Draper
 Match box J. Long
 Match box P. F. Quinn et al
 Match composition J. A. Wendel
 Match safe D. S. Kissam
 Measuring and recording intervals of time. Electric apparatus for C. J. Springer
 Meat press G. Freysleben
 Mechanical movement R. V. Collins
 Medicaments. Method of and apparatus for impregnating parts of the body with J. Lutje
 Metal post G. F. Clingman
 Metronome T. Weisser
 Mine shaft door J. Wineland
 Mirror support F. Mankey
 Mirrors, pictures, &c. in metallic frames. Means for mounting J. P. Eustis
 Molding apparatus J. Anderson
 Monkey wrench L. C. Barcus
 Monkey wrench E. A. Renouf
 Mowing machine swather attachment J. Hoffman
 Mustache F. Oberdorfer
 Nail puller J. H. de Granada et al
 Nap restoring device A. W. Foster
 Necktie band holder G. G. Parsons
 Neckwear C. Babson
 Night light or lamp J. R. Bentote
 Nitrogen or other compounds. Apparatus for electrical production of J von Kowalski et al
 Nut lock H. C. Holliday
 Oil cup. Self regulating M. Crowther
 Optical illusions. Apparatus for producing F. J. Straub
 Optometer W. J. Laughlin
 Ores, mattes, &c. Treating J. A. Potter
 Oven front F. J. Albrecht
 Ozonizer A. Vosmaer et al
 Packing. Rod 2 pats. J. Hodge
 Pail. Milk J. H. King
 Paint buckets in permanent position on the roofs of buildings. Device for holding L. Wallace
 Paper board drying machine T. W. McFarland
 Paper. Commercial C. L. Pritchard
 Paper feeding machine. 3 pats. T. C. Dexter
 Paper making machine suction box E. C. Andrews
 Parcel attaching device H. F. Roll
 Pastry or rolls. Contrivance for making hollow C. Forcke
 Peeler. Fruit J. C. Bell
 Pen, &c. Reservoir A. Munro
 Pencil. Lead J. A. Mulvey
 Phonograph, &c E. A. Ivatts
 Photographic apparatus. Automatic J. Powers
 Photographic case for tombstones J. W. M. Witt et al

Photographic plate.....A. A. Gurtner
Photographic printing frame.....J. Whetham
Photographic printing machine.....H. H. McIntire
Photographic printing machine.....F. P. Stevens
Pipe coupling.....J. E. Tinker
Pipe covering.....M. Sullivan
Pipe hanger.....T. Fee
Plant protector.....C. Leigh
Plate lifter.....G. S. Solomon
Pole climber.....F. N. Schmucker
Portable bath or sack for washing or bathing purposes.....A. Herz
Post office furniture.....M. S. Field
Postal money carrier.....W. G. Hough
Powder container.....J. M. McIntyre
Powder rod or grain and making same. Smokeless.....H. Maxim
Preserving fruit.....F. Passarelli
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Printers' rollers. Machine for cleaning.....S. Crump
Printers' rollers. Making.....S. Crump
Printing.....W. Thomas
Printing curves. Typographically.....V. A. Brusselet
Printing machine.....G. F. Read
Printing machine.....J. White
Printing machine. Electric.....G. S. Gallagher
Printing presses. Means for attaching blankets to cylinders of.....A. B. Stewart
Pulp grinder.....M. O. Kasson
Pulp strainer. Horizontal.....P. Reinicke
Pulverizer and roller. Combined.....M. G. Cameron
Pump.....F. W. & C. A. Krogh
Pump valve.....O. Arendt
Punch.....R. M. & G. T. Pull
Pyrographic apparatus.....A. S. Dietz
Quadrant. Traverse.....H. G. Nichols
Radiating device. Heat.....J. H. Bullard
Radiator.....G. A. Mower
Rail joint.....A. Chrestensen
Rail joint.....J. R. Gilbert
Rail support.....J. Chappuis
Railway brake.....H. A. Spiller
Railway joint fastening.....W. H. Case
Railway motor. Electric.....R. Siegfried
Railway signaling.....F. B. de Chevannes
Railway signaling system.....2 pats. H. Bezer
Railway switch.....F. Uhtbrock
Railway switch. Automatic.....W. C. Sayrs
Railway tie.....G. Walberg
Railway trains and for signal purposes. Apparatus for stopping.....B. A. J. Van der Hegge-Zijnen
Refrigerator car.....P. D. Ball
Relay.....H. P. Clausen
Relay. Polarized.....M. C. Korty
Resinous substances. Production of.....G. Fry
Resistance. Shunt.....G. W. Richmond
Ribbon spool.....J. A. Bedworth
Roasting furnace.....S. D. Craig et al
Rocking chair. Invalid.....B. M. Owen
Roof covering. Sheet for.....W. H. Bache
Roofing. Prepared.....S. R. Holland
Rotary engine.....O. Williams
Rotary engine.....C. MacArthur et al
Rotary engine.....A. C. Ackerman
Rotary engine.....O. De Champ
Rule. Slide.....C. G. Barth et al
Ruler.....J. H. Jacobs
Sad iron. Electric.....G. J. Schneider
Sample carrier and display rack. Combined.....P. H. Moog
Sash attachment. Window.....L. E. W. Banks
Sash balance.....G. W. Ogden
Sash balance.....H. E. Rathbun et al
Sash. Fixture for hanging.....J. Kirby, Jr
Sash lock.....A. M. & C. L. Southard
Saw. Circular.....O. Granberg
Saw handle. Drag.....P. M. Irish
Sawing appliance.....V. Speigle
Sawing machine work holder.....J. Piper
Scale. Computing.....H. C. Stilwell
Scalp. Device for applying liquids to the.....A. J. Farmer
Screens. Fly exit for.....E. E. Stover
Seal for bags, &c.....L. J. Simmons
Seat lock.....H. C. Swan
Separator.....H. J. Silvis
Serum storing and administering device.....F. G. Ryan
Set works.....J. J. Galway
Sewing machine attachment.....R. H. Legg
Sewing machine binder.....W. R. Abercrombie
Sewing machine guide.....O. Kiesewetter et al
Sewing machine hemmer attachment.....A. Laubscher
Shade hanger. Window.....J. C. Forsberg
Shaft draft appliance. Vehicle.....S. Gregory
Shaft. Pulley.....T. F. Cuddy
Shears.....G. B. Rowe
Sheets. Means for facilitating interleaving.....T. G. Hyde
Shell. Ammunition.....E. von Reichenau
Shelving.....T. Hall
Ship builder's clamp.....N. C. Bailey
Ship construction.....A. B. Wolvin
Shirt waist holder and skirt supporter.....A. Wiltsey
Shock compressor.....G. A. Olson
Shoe holder.....P. S. Kinsey et al
Shoe tree.....J. H. Burt et al
Show case.....J. Partheymueller
Side register for sheet folding or other machines.....C. A. Sturtevant
Signaling apparatus.....O. Luddeckens
Signaling by electromagnetic waves.....2 pats. R. A. Fessenden
Signaling. Wireless.....R. A. Fessenden
Sleigh knee.....P. S. Lockwood
Snaps to leather lines. Clamp for fastening.....W. W. Spohn
Soap and brush holder.....M. E. Heertagen
Soap cake.....L. S. Samuel
Soldering rolling machine. Wire.....A. Lotz
Sorting machine.....J. Riddlebaugh
Soundings. Instruments for taking.....E. E. Wigzell
Sparker.....F. Dickinson
Speed changer.....G. E. Greenleaf et al
Speed cone.....J. Heertagen
Speed mechanism. Variable.....J. Parker
Spindle driving band tension device.....T. H. Greenwood
Spring motor.....J. E. Gibbs
Stamp affixer and envelop sealer.....E. A. Emmerling
Steam boiler.....J. A. Mumford
Steam boiler.....C. G. Curtis
Steam boiler.....F. J. Rowan

Steam boiler.....J. Wehrle
Steam trap.....J. G. Duck
Steel. Manufacturing.....O. Massenez
Steel projectiles. &c. Manufacture of hardened.....R. A. Hadfield
Stencil.....J. T. Comross
Sterilizing, heating, and boiling liquids. Apparatus for.....J. E. Siebel
Storage tank or receptacle.....W. M. Fulton
Stove attachment.....C. H. Torrens
Stove attachment.....J. S. Van Buren
Stove. Gas.....A. C. Witman
Stove. Heating.....T. M. Barbee
Stove top.....W. C. Kueale
Strainer.....M. H. Viner
Studding. Sheet metal.....H. Wittekind et al
Submarine preserving and antifouling composition.....M. H. Devey
Surgical chair.....A. McDannold
Swing and fan. Combined.....D. W. Bash
Syringe.....E. Bartsch
Table and bed. Combined.....L. C. Graessle
Table lock. Pedestal.....C. S. Burton
Table lock. Pedestal.....E. Tyden
Tea kettle.....W. B. Bulmer
Telephone attachment.....J. Blum
Telephone exchange switching apparatus.....E. H. Smythe
Telephone exchange toll apparatus.....F. R. McBerty
Telephone or telegraph system.....T. W. Gleeson et al
Telephone repeater and system S. P. Levenberg
Telescope. Low power.....A. Konig
Telescopic joint for shafting, &c.....E. G. Hoffmann
Therapeutic purposes. Spiral vacuum tube for.....R. Maclett
Thermometer holder. Clinical.....G. E. Nettleton
Thill attachment.....M. D. Le Roy et al
Threshing machine and machine used for analogous purposes.....J. F. Sanderson
Tie plate.....A. St. Pierre
Tiles, mirrors, &c. Support for.....J. P. Benjamin
Timber estimating device.....C. L. Walker
Time recorder.....G. White
Tire. Vehicle.....M. V. Rush
Tires in continuous lengths. Vulcanizing.....G. A. Ludington
Tobacco clamp.....R. C. Dick
Tobacco pipe.....J. Pareis
Tool. Pneumatic.....W. H. Soley
Top roll saddle.....2 pats. E. Dixon
Toy air rifle.....T. W. Craven
Toy. Hollow india rubber article used as a.....F. Kuhlmann
Track switch opening or shifting device.....W. D. Simpson
Track system. Overhead.....G. F. Steedman
Traction wheel.....W. E. Harris
Transformer case.....W. L. Waters
Transplanter. Beet.....H. Hunter
Trolley track switch. Overhead.....W. L. Clark
Trolley wire finder.....W. Barnhurst
Truck. Car.....H. Tesseymann
Truck. Car.....H. C. Buhoup
Trunk protector.....J. Haigh
Truss. Hernia.....C. P. Norris
Tumbling machine.....J. P. Bucklin
Turbine. Elastic fluid.....W. L. R. Emmet
Turbine. Expansive fluid.....B. S. Church
Turbine. Vertical fluid pressure.....G. Westinghouse
Twine feeding machine. Grass.....E. A. Lundgren et al
Type writing machine.....C. Gabrielson
Type writing machine.....F. S. Rose
Type writing machine.....H. Ellis
Type writing machine aligner.....J. Alexander
Type writing machine ribbon spool.....J. A. Bedworth
Umbrella.....J. L. Vaughn
Umbrella and sunshade.....H. B. Gra
Valve.....A. B. Wright
Valve.....L. I. Griffiths
Valve. Controlling.....A. H. Mosher
Valves. Fluid pressure coupling for air brake.....D. H. Staples
Vanillin. Making.....R. N. Riddle
Vehicle body hanger.....C. La Dow
Vehicle wheel.....G. W. Sanford
Wagon. Dump.....H. A. Moyer
Wagon. Hoisting.....A. E. Johnson
Wagon reach.....E. Keffer
Wall structure.....P. J. McGuire
Washboard.....H. M. Haas
Washing machine driving mechanism.....E. L. Patterson
Watch stem winding and setting mechanism.....C. Rode-Stucky
Water gage.....J. Zoanetto
Water purifying apparatus.....J. C. W. Greth
Water trunk or flood gate. Tide.....J. C. Heidt
Water wheels. Antifriction bearing for.....R. W. O. Rehmenklau
Weighing wagons, &c. Machine for W. Holzer
Well packer. Oil.....C. M. Heeter
Well strainer. Drive.....W. H. Broome
Wheat or other grain shredder.....J. H. Stevenson
Wheel fender.....M. E. de los Monteros
Wheels. Manufacturing.....T. D. Harris
Whistle.....F. L. Johnson
Window frame and sash.....A. K. Lovell
Wire reeling apparatus.....C. L. Packer
Wire reeling machine.....T. Nighbert
Wire rod cleaning machine.....J. S. Ferguson
Wire weaving machine coiler.....W. Bills
Wool burring and picking machine.....G. Prouvot
Wrench.....A. L. Elief et al
Wrench.....G. E. Fox
Wrench.....C. H. W. Relyea
Wrench.....J. M. Reams
Wrench.....C. E. Hawkins et al
Wrench.....W. R. Johnson
Wrench.....J. R. Harrison
Writing machine carriage spacing attachment.....L. Maybaum
Zinc. Obtaining.....E. H. Hopkins
Zinc. Portable machine capable of bending or molding sheet.....A. H. Bif

DESIGNS.

Braid.....H. P. von Nostitz
Card. Playing.....2 pats. S. N. Barker
Cup or similar article.....C. J. Ahrenfeldt
Glass vessel. Cut.....W. C. Anderson
Jewel casket or similar article.....E. L. Brainard
Picture frame mat.....C. A. Hartman
Plate or similar article.....4 pats. C. J. Ahrenfeldt
Plate. Souvenir.....M. Tonnemann

Spoons, forks, or similar articles. Handle for.....J. Clulee
Spoons or similar articles. Handle for.....S. J. Large
Teapot or similar article.....C. J. Ahrenfeldt

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Adding machine.....W. H. Clark
Adjustable wrench.....E. Bordewisch et al
Air braking systems. Audible alarm for.....J. H. Clark
Air heater.....J. Waterhouse
Air or other gaseous bodies. Compressor for.....H. C. Sergeant
Aluminium sulfate. Making.....H. Spence
Ammonium nitrate. Making.....W. Mills
Amusement apparatus.....W. S. Reed
Antiseptic telephone mouthpiece.....W. M. English et al
Apparel wearing.....L. S. Altheimer
Automobile lifting truck.....W. S. Kessler
Back rest. Folding.....B. B. Billmyer
Bag holder.....D. Madden et al
Bale or package cover.....I. Schlichter
Baling press.....T. F. Ormond
Baling press door closer.....E. Davis
Band fastener.....F. Sedlmair
Barrel.....F. E. Gage
Battery tray. Storage.....T. A. Edison
Beams. Securing strips of wood, &c., to iron.....S. Davis
Bearing. Ball.....T. H. Duncombe
Bearing. Conical roller.....J. P. Cowing
Bedclothes holder.....H. Crocker
Bedstead attachment.....A. B. Shane
Beet blocking machine.....A. R. Mundi
Belt fastener.....I. Jackson
Bib or faucet.....C. Peck
Bicycle.....C. N. Stilson
Bicycle gearing.....H. F. Maynes
Bicycle gearing.....C. S. Thompson et al
Binder and file for pamphlets, books, ledgers,.....F. B. Whitney
Binder. Loose leaf.....J. L. Hanson
Binder. Temporary.....J. P. Mentzer
Bird cage.....J. A. Quelch
Blasting charges. Machine for preparing.....F. J. Trayssac
Boll weevil catcher.....S. V. Ivey
Bolting sieve cleaner.....C. A. Shultz
Bottle filling apparatus.....J. Anderson
Bottle filling machine.....E. H. Parker
Bottle stopper. Non refillable.....2 pats. J. G. Reddick
Bottles. Stopper for preventing refilling.....G. B. Okey
Bowling alley. Portable.....F. Kary
Brake beam.....A. Lipschutz
Brake shoe.....J. D. Gallagher
Brake shoe and producing same.....C. G. Ette
Brake shoe holder.....A. M. Pennock
Braiding implement. Oil burning.....G. Fuller
Breastpin safety catch.....J. C. Nordt
Bridge and tailpiece. Combination.....E. Reach
Bridle bit.....H. S. Anderson
Broom moistener.....W. S. Reynolds
Buckle.....A. Addington
Building, &c. blocks. Apparatus for making.....J. Brower
Building, &c. blocks. Making.....J. Brower
Burglar alarm.....N. A. Lyle
Bushing.....G. & J. Strehl
Butter separator.....J. Meyrick, Jr
Button and tie. Collar.....H. L. Blais
Cabinet. Kitchen.....C. F. Kade
Cable clip.....J. McFarlane
Cake trimming machine. Layer.....C. F. Dietz
Calculating and recording machine.....C. D. Baird
Calendars and similar sheets. Machine for bordering.....J. F. Ross
Can fluxing apparatus.....J. G. & M. O. Rehffuss
Can making machine.....2 pats. J. G. & M. O. Rehffuss
Can tops and bottoms from forming dies. Pneumatic means for removing.....J. G. & M. O. Rehffuss
Cans. Machine for putting tops and bottoms on.....J. G. & M. O. Rehffuss
Cans preparatory to being fluxed and soldered. Apparatus for heating.....J. G. & M. O. Rehffuss
Car brake.....H. E. & M. L. Brown
Car brake. Emergency.....S. A. Duvall
Car brake operating mechanism.....J. L. Peacock
Car brake. Passenger.....M. Tetz
Car coupling.....W. F. Richards
Car coupling attachment. Railway.....W. Thornburgh
Car discharging device. Dump.....J. W. Seaver et al
Car. Dump.....O. W. Meissner
Car friction draft gear. Railway.....2 pats. T. L. McKeen
Car friction draft gear. Railway.....2 pats. P. N. Moore
Car friction draft rigging. Railway.....W. H. Miner
Car friction spring draft gear. Railway.....P. N. Moore
Car friction spring draft rigging. Railway.....2 pats. P. N. Moore
Car platform.....N. Paulson
Car replacer.....E. Best
Car. Steel.....P. Wagner
Car track brake.....J. A. Brader
Car window sash lifter.....A. R. Bell
Cars. Megaphone attachment for passenger.....W. H. Brunt
Cars. Tandem friction spring draft rigging for railway.....P. N. Moore
Carburetor.....F. Jas
Carding machine attachment.....G. W. Taylor
Carding machine feeding mechanism.....P. L. McBride
Carpet beating machine.....C. P. Carey
Carriages. Automatic brake shoe for baby.....J. F. Snyder
Case.....G. A. Schwanbeck
Cash carrier apparatus.....J. H. D. Chamberlain et al
Cash carrier apparatus.....D. E. Chism
Cash carrier box.....D. E. Chism
Casing turner.....W. Nesbitt
Cash bush or liner and means for attaching same.....J. Ross et al
Catapult.....L. G. Clark
Centrifugal machine.....J. H. Ostrander

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Churn.....J. D. Metcalf
Circuit breaker. Automatic.....W. M. Scott
Cistern top.....S. Pomroy
Clasp.....F. Charron et al
Clock. Astronomical.....J. C. Burke
Clock. Electric.....D. W. Thompson
Cloth holding device.....E. Gessner
Clothes pounder.....V. T. & E. W. Lynch
Clutch mechanism.....C. F. Thomas
Clutch mechanism. Friction.....S. J. Davis
Clutch. Speed regulating magnetic.....C. A. Pratt
Coal elevator.....J. Deady, Jr
Cock. Stop and waste.....J. M. Teahen
Coffee. Roasting.....T. R. Timby
Coffin.....J. J. Schneider
Coin controlled machine automatic register.....C. S. Ellis et al
Cold storage apparatus.....M. Cooper
Compressing dies.....T. A. Edison
Concrete construction mold. Metal.....C. Weber
Concrete, &c. Machine for mixing.....J. E. Kenisell
Conduit outlet box. Interior.....W. F. Bossert
Connecting rod or pitman.....C. H. Howland-Sherman
Cooking utensil support.....J. W. Marshall
Copy holder.....K. R. Williams
Corn shock loader.....E. T. Maxwell
Cotton chopper.....T. J. Lowry
Couch spring.....E. A. Anderson
Crate. Banana.....J. A. Hadley
Cream roll forming machine.....C. F. Dietz
Cross tie. Metallic.....C. W. Platt
Curtain and shade holder. Window.....H. T. Andrew
Curtain attachment. Window.....O. A. Essig
Curtain pole.....D. Brehm
Cyanids and nitrates. Making.....W. E. Everette
Cycle. Automatic coasting.....E. A. Smith
Damper mechanism. Time.....W. Hartzell
Dark room. Portable.....W. H. Levey
Digging and loading machine.....D. McDonald
Dividers.....T. R. Skinner
Dolls or other toy figures going on rolls. Mechanism for walking.....P. Fuchs
Domestic boiler.....S. C. Shoup
Door check and closer.....J. A. Young
Door check and closer.....W. Pelzer
Door or like frame.....E. Ohnstrand
Draft rigging.....2 pats. H. C. Williamson et al
Draft rigging.....W. Thornburgh
Draft rigging. Tandem spring.....W. H. Miner
Draft rigging. Tandem spring friction.....W. H. Miner
Drafting implement.....H. A. Swenson
Dredging and sluicing device. Submarine.....R. G. Riley
Dress shield.....J. H. Lee et al
Drier rack.....A. J. Zilker et al
Drill bits, &c. Fastening device for.....C. P. Brintzhoffer
Drill or pump rod grapple.....J. Luke
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Easel.....J. Weber
Electric circuit limiting device.....C. W. Potter
Electric furnace.....C. A. Keller
Electric socket support.....E. K. Gill
Electric time alarm.....E. M. Benesch
Electrical distribution means.....J. L. Creveling
Electrical plug and receptacle.....G. W. Goodridge
Electrical selective apparatus.....F. D. Pearne et al
Electromagnetic device.....E. K. Muller
Elevator safety appliance.....J. Cruickshank et al
Engine.....C. F. Chandler
Engine cooling device. Explosive.....J. White
Envelop or card feeding device.....D. S. Dufur
Eraser. Blackboard.....P. Seith et al
Excavating machine.....J. D. Moran
Expansion bolt.....J. B. Gottsalk
Explosive engine.....S. S. & A. Lewis
Extensible case.....2 pats. E. C. Schriber
Fabrics. Finishing.....H. Bock
Farm gate.....C. P. Emery
Feed bag. Horse.....J. Ratzer
Feed water purifier.....J. M. Smith
Felt spreader.....J. H. Ostrander
Fertilizer distributor.....M. M. Baker
Finger nail buffer.....C. E. Moser
Fire alarm. Automatic.....M. K. Fred
Fire and water proof insulating covering for metallic surfaces.....J. E. Heany
Firearm safety device.....G. A. Horne
Fireproof construction.....G. Liebau
Fireproof floor construction.....R. C. Kyle
Fireproof window frame and sash.....I. W. Emerson
Fishing tackle.....S. Robbins
Flash light apparatus. Photographic.....I. G. McColl et al
Flexible tube.....S. Palmer
Flooring, roofing, &c. Structural arrangement applicable to.....E. L. Pease
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Fluid pressure brake.....G. M. Spencer et al
Freezing tank.....C. W. Vollmann
Furnace.....D. J. McKenzie
Furnace for burning tan or like fuel.....D. M. Myers
Fusion. Treating matters in.....P. L. Hulin
Galvanic battery. Reversible.....T. A. Edison
Garbage removing device.....E. G. Poppe
Garment clasp.....A. J. Krietz
Garment stretcher.....J. B. Miller
Garment supporter.....L. E. Schoch
Gas and coke. Retort for making.....A. C. Kroman
Gas burner. Atmospheric.....A. E. Harris
Gas burner. Regenerative.....J. W. McKnight
Gas detecting means. Thermostatic.....J. E. Baldwin
Gas detector.....G. A. Nelson
Gas engine.....P. H. Brennan
Gas generator. Acetylene.....W. A. Robertson et al
Gas purification. Apparatus for.....F. Jas
Gate.....H. H. Bell
Gate opener.....G. C. Laney
Gear molding machine.....F. Kepp
Gear. Transmission.....P. H. Brennan
Gear. Variable speed and reversing.....H. R. Bevier
Gearing. Differential.....H. E. Bayley
Gearing. Variable speed.....A. B. Shultz et al
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Glass working machine.....J. W. Colburn
Glove turner.....G. Burr
Gold separator.....A. C. La Bud et al
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Governor. Engine G. Merkel
Grain blower F. M. Smith
Grain separator J. K. White
Grain separator straw rack J. Johannick
Grinding and polishing machine. J. B. Lobet
Grist mill S. L. Shelby
Guide wheel A. H. Mathesius
Gun. Automatic F. Novotny
Gun. Electromagnetic K. Birkeland
Gun shell ejector mechanism. F. Novotny
Gun sight. Shot. P. O. Elterich
Guns. Fluid brake for recoil. E. K. Rothe
Hair dressing device. J. T. Wilcox
Hammer. Steam. C. E. Billin
Hanging basket and pot. Combination F. Neidl
Harness rack C. H. Mustgrove
Harvester B. Hollhaus
Harvester butt adjuster. J. F. Steward
Harvester. Corn. A. Neer
Harvester grain deck. A. Reinhardt
Harvester headboard. J. F. Steward
Harvester tongue truck. E. A. Johnston
Harvester topper and stripper. Cane G. D. Luce
Hat fastener F. S. Boedefeld
Hat pin or fastener S. L. Troupe et al
Header and stacker. Combined. J. H. Kindsvater
Heat regulator. Automatic electric D. N. Leib
Heddle bar fastening. W. Fehr et al
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Hide working and unhairing machine. R. F. Whitney
Hinge. Separable screen 2 pats H. B. Higgins
Hinge. Separable screen. 2 pats C. Rowland
Honey. Fermenting A. V. Kouba
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Horse rake J. H. Randolph
Horseshoe J. A. Martin
Hub. Metal covered vehicle. G. A. McKeel
Ice creeper C. F. Recknagel
Ice tank J. I. Hopkins
Induction coil R. Miller, Jr
Ingot crane C. L. Taylor
Internal combustion engine for cycles. H. Lepape
Intestine wringer. Beef H. C. Zitrnick
Iron pyrites from zincblende. Separating. K. Danziger
Ironing table. W. O. Schellhamer
Kettles, &c. Attachment for jacket. F. M. Kimball
Kiln door H. H. Hackerl
Labeling machine D. W. Kneisl
Lace ladder. Shoe. N. Comp
Lace or shoestrings holder. Shoe. B. E. R. Thomson
Ladder and scaffold support. T. Cogeman
Ladder hanger. S. C. Johnson
Lamp. Electric pocket. A. E. Post
Lamp for canes, umbrella sticks, &c. J. W. Allen
Lampblack making machine. J. H. Mann
Larding or salting device. R. R. Reynolds
Latch D. W. Tower
Lead salts. Making. W. Mills
Lens carriage securing means. C. E. Hutchings
Letter box, door bell, and name plate. Combination. H. Messersmith
Leveling instrument. G. G. Townsend
Line casting machine. W. S. Scudder
Link. Separable. E. C. Vale
Linoleum carpets. Manufacturing. F. K. Magnus af Ekstrom
Linotype machines. Producing notches in linotypes or slugs as they are cast in. W. R. Speechley
Liquid distributing system. 2 pats. R. B. Williams, Jr., et al
Liquid separator. Centrifugal. T. H. Springer
Lister attachment. J. A. Herron
Loading apparatus. E. T. Maxwell
Locomotive boiler. S. F. Prince, Jr
Loom shedding apparatus. N. & J. Chaize
Loom web replenishing mechanism. W. H. & H. H. Hacking
Lubrication. Apparatus for force feed. J. F. McCanna
Lubricator. J. J. Aull
Mail box carrier. G. B. Okey
Mail carrier. F. P. O'Neill
Mail delivery box. T. B. Gray
Map E. Heubach
Massage device. O. Zar-Adusht-Hanish
Massage machine. P. J. Kroll
Match case. S. Robert
Measure. Tailor's. S. M. Griffen
Measuring and weighing machine. R. L. Patterson
Metal plate doubling machine. B. H. Doll
Microscopes. Fine adjustment for. C. F. Dieckmann
Milking machine. J. L. Hulbert et al
Miter box. 2 pats. J. A. Traut
Molding apparatus. R. A. Penrose
Mop wringer. C. E. Hill
Mortising chain cutter. Portable G. A. D'Isopo
Mountain climber. Reversible. N. Laub
Mouse trap. T. L. Ray
Mowing machine pitman connection. F. P. Burkhardt
Music rack. Folding. J. H. Rockwell
Musical instruments. Means for regulating the expression of mechanical. R. W. Pain
Nail extractor. A. Dudley Sr
Nitrogen compounds from atmospheric nitrogen. Making. H. Mehner
Nozzle. Exhaust. W. S. Clarkson
Nut. Lock. G. B. Evans et al
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Nut lock. J. E. Hedrick
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Oil cake treating apparatus. A. E. Lawther
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Ore and pulp sampler. Automatic. C. Allen
Ore and slime separator. Automatic. C. Allen
Ores from magnetic gangue. Separating. T. A. Edison
Organ. D. Schustek
Oven. Bake. H. Heacker
Package. Shipping. J. A. Bower
Packing. Rod. N. H. Albrecht
Padlock. J. B. Miller
Paper folding machine reissue E. D. Casterline
Pedestal. Angular. C. H. Howland-Sherman
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Petroleum. Apparatus for refining crude. J. M. O'Neal

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Phosphorus compound and making same. Organic. S. Posternak
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Photographic film. Flexible. F. A. Anthony
Photographic view finder J. A. Robertson
Piano attachment. Pneumatic. R. C. Pryor
Piano players. Pedal stop action for automatic. W. F. Cooper, Jr
Pipe and nut wrench. Combined. J. C. Snider
Piston rod. H. A. J. Neumann
Pitman. K. F. Seith
Plant support and holder. Adjustable. E. C. Chessman
Plow J. Kheil
Post hole digger. C. Butcher
Power machine. Hand or foot. J. P. Cline
Power mechanism. Interchangeable hand and motive. C. E. Ellicott et al
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Pump J. M. Crowley
Pump. Heating and condensing feed. W. Tate
Pump. Lubricating. J. F. McCanna et al
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Pyrographic work. Tool for. Z. N. Tyssowska
Rail bender. R. O. Hintz
Rail joint. W. Watkins
Railway cross tie. T. J. Kitto
Railway danger signals. Electrically operated stopping means at. W. L. Adamson
Railway. Electric. R. A. E. Huber et al
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Railway rail joint. A. Barnes
Railway rails. Device for preventing the creeping and wandering of. E. Masik
Railway switch. T. E. Gummerson
Railway switch. Automatic. M. M. Whitfield
Railway tie plate. W. S. Jones
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Rheostat. C. R. Pitrat
Ring and listening key. C. H. North
Roll holder. J. Burry
Roof valleys. Means for covering tile. W. Ludowici
Rope haulage socket. G. W. Minto
Rotary engine. H. Berglund
Rotary steam engine. H. C. Mitchell
Rule. P. S. Hamrick
Safe. E. E. Thompson
Safety pin. A. Buckelew
Sash holder and lock. N. E. Howe
Sash. Pivoted. G. Kabureck
Sash. Window. G. H. Lawrence
Scenic effects. Apparatus for producing. E. O. Healy
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Scenographic apparatus. E. J. Austen
Scholar's companion. A. E. Greves
School companion. T. Crawford
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Seat spider. H. W. Bolens
Seine hauling apparatus. H. C. Albee
Self adjusting wheel. E. A. Root et al
Semielliptic spring. T. A. Shea
Sewing machine feeding mechanism. D. Noble
Sewing machine ruffing mechanism. A. Laubscher
Shade goods. Machine for trimming and applying. E. O. Engberg
Sharpening. Disk. W. J. Julian
Shaving mug. I. E. Foltz
Sheet metal edging machine. E. F. Lockwood
Shelf support. Adjustable. 2 pats. E. G. Schrieler
Shoe attachment. Athletic. J. G. Mitchell
Shovel and foot protector. A. Christiansen
Shoveling device. J. G. Westbrook
Show case. W. H. J. Guest
Show case. C. W. Selden
Shutter worker. F. D. Marchand
Shuttle. Float detecting. E. Lamoureux
Sidewalk on street crossings. J. A. Rose
Siding. Sheet metal. E. G. Charlebois
Sieve. F. W. Hasch
Signaling system. Wireless. H. Shoemaker
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Soldering machine. Can J. G. & M. O. Rehfuess
Speaking figure. G. W. Spencer et al
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Stacker. Pneumatic. J. Henry
Steam boiler. C. B. Rearick
Steam boiler. R. W. Barton
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Stove fire box. Cooking. J. Mulveny
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Tie fastener. E. F. Priddat
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Tire. Pneumatic. S. Dupont
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Tool. Combination. H. Schmidt et al
Tool. Pneumatic. C. W. Peck
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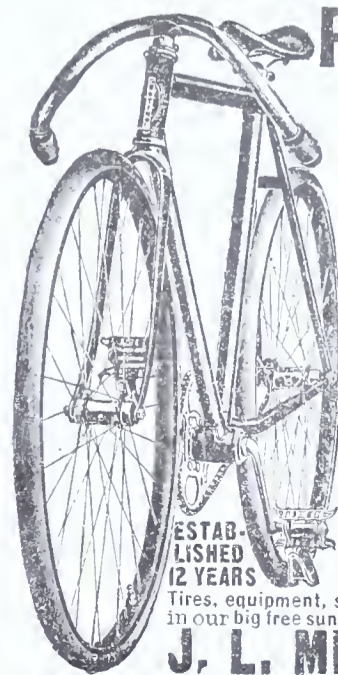
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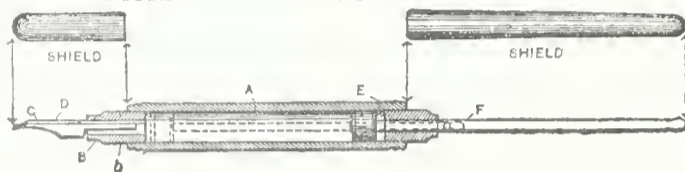
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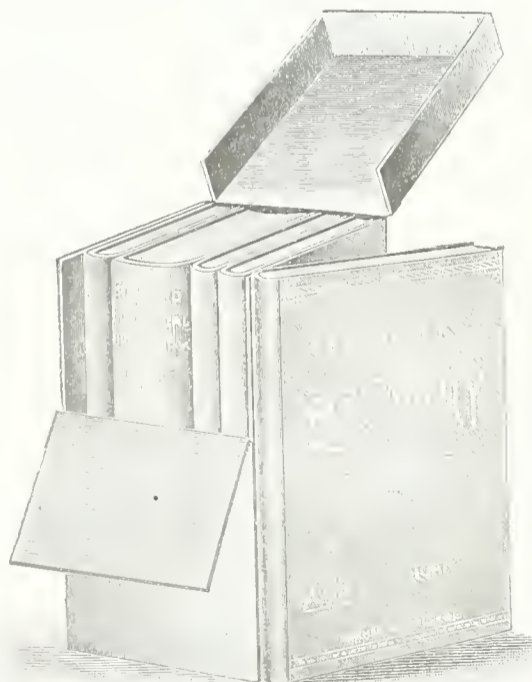
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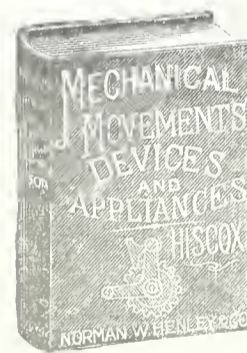
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Work on the Panama Canal.

AFTER discussions covering three quarters of a century; after investigations and delays innumerable; after a war had crystallized public opinion and a revolution made feasible the prompt transfer of the property, and after a final knot of red tape that reached all the way to Paris and back, the Panama Canal is on the high road to be a fait accompli. Further delay in the line of sanitary reforms must be expected; the country around Colon must, by drainage and other hygienic measures, be transformed from a hotbed of pestilence into a habitation fit for the white race; questions of refrigeration, of food preservation and of labor, must be solved; but these will involve at most only a period of months, and in the graphic vernacular of the street, it is up to Uncle Sam to roll up his sleeves and dig. It is of interest to note what implements he will find ready to his hand. Of the hundreds of millions of dollars poured into the trench at Panama by the inefficient French companies, thirty millions was for machinery and plant. This included locomotives, excavators, dredges,

buy this plant as a whole, and that no special allowance should be made for it in estimating the value of the property. Portions of it, it was advised, could be made the subject of special negotiation, if it was found advantageous to purchase it.

For the last few years, when the purchase of the canal by the United States seemed imminent, the company in charge has been merely "marking time," employing a force only large enough to prevent its concession from lapsing. Since 1895, only some 5,000,000 cubic yards have been excavated, which, added to the 72,000,000 cubic yards cut by the old company, make 77,000,000 yards. Much of this is of no value, because of the subsequent changes of plan. About half of this work can be utilized, leaving some 95,000,000 yards still to be dug, exclusive of the work on the Bohio dam and the spillway. The efforts of the French company were, at the time of the transfer, concentrated at the famous Culebra and the Bas Obispo cuts, employing about 400 men. The illustration



STEAM SHOVEL AT WORK IN THE CULEBRA CUT.

cars, rails, machines and tools of various kinds, besides buildings used for offices, storehouses, quarters, hospitals, etc. Much of this was ruined or abandoned by the notoriously extravagant company first organized to carry out the canal project. Since 1889, when the second company took charge, the property shows signs of care and attention. Nevertheless, much of the plant is ill adapted to American methods, and all of it is from 15 to 20 years old, during which period the improvements in this class of machinery have been such that contractors would generally find it to their advantage to buy entirely new machinery of modern pattern, rather than attempt to use this, even if it were given to them free. The locomotives—among the best preserved of the apparatus—are lighter than is desirable for economical service; the rails are of a pattern ill fitted to rough use, and the cars—probably the best part of the whole outfit—have narrow-tread wheels. On this account, the Canal Commission recommended that, in acquiring the canal, the United States should not

shows a steam shovel at work in the Culebra cut, the highest point above sea level. This cut is to have a width at the bottom of 150 feet, and the sides will be lined for some distance up with masonry walls, having nearly vertical faces and furnishing benches 38 feet wide on either side of the canal, on one of which the Panama railroad will be laid, while it is probable that a service track will be placed on the other.

The difficulty of the work here lies in the instability of the earth; but engineers declare that this will be obviated by drainage. The surface may require some repairing with concrete, but with the broad benches on which any slight slides can be arrested, and the masonry walls, it is believed that no trouble will be experienced. The estimated cost of the 6 miles of work on this section is over \$40,000,000, and 8 years will be required to complete it. It is said that the concentration of so large an amount of excavation in so small a space is without precedent, and thorough organization, and tools especially adapted to the work, are required.

Electrically Thawing Out Frozen Water Pipes.

Thawing out frozen water-service pipes by electricity became popular in many a household during the past severe winter, so that what was formerly a relatively costly, and exceedingly slow, and an-all-around inconvenient process, involving the digging up of streets and the building of fires in the excavations, resolved itself into an interesting electrical experiment, cheap, quick, and thoroughly efficient. Briefly, the method has been to complete an electric circuit through the frozen water service pipe by attaching one wire of the circuit to the street hydrant, and the other to a faucet in the building. The iron pipes being much better electrical conductors than the frozen earth, the electric current followed the pipes and heated them sufficiently to melt the ice in a comparatively short time. In cases where street hydrants were not conveniently located, the circuits were completed by connecting up pipe outlets in two adjoining houses; but in the case of isolated buildings there remained no other way of getting one of the terminals than by digging down at some point in the street, or outside the building, to reach the pipe. Even in this extremity, however, there was not that trouble and delay which attended the old wood or coal fire method, while there was greater certainty of action.

The electric current usually was taken from conveniently located electric lighting circuits, the voltage being reduced to from 20 to 50 volts by means of portable step-down transformers carried on wagons, and for further regulation of current and pressure suitable resistances were employed. In some instances portable generating sets were employed, consisting of steam or gas engine-driven generators, with their accessories, and in still other cases storage battery outfits, moved about from place to place on wagons, were used for the work. In at least one instance, it is interesting to note, the best part of a day was wasted in the attempt to thaw out electrically what seemed to be an unusually refractory pipe, before it was learned that earthenware water mains, —non-conductors of electricity,—were used in that particular place. That is the only case in which the electric process is known to have been a failure.—*Cassier's Magazine*.

The Practicability of Air Ships.

The mists of the future still hide the air ship that will be used as a conveyance, making regular trips, carrying people to and fro above the earth on business and pleasure; but the coming of the practical ship is inevitable. I will not venture to say how soon it will arrive, but I think that many who are now alive will move over the housetops in air ships, when most houses will have entrances on their roofs. I have no faith in the idea that flying machines may be devised for single individuals, or that the correct principle may be found by studying and copying the flight of birds. When such plans are suggested, I am reminded of the ideas and efforts of inventors who, a century ago, tried to make locomotives with four legs, to operate like horses. The thought of these mechanical experts was that, since the horse moved more rapidly across the land than almost anything else with which they were familiar, it followed that any mechanism that was to attain a greater speed would have to be constructed and operated in a similar way.—*Santos Dumont in Success*.

OUR NEW ISLANDS.

THE fact that the Pacific Squadron has been ordered to proceed to the Aleutian Islands will surprise those who have not followed the course of recent discoveries in that archipelago—discoveries of the most far-reaching importance for the United States. The war operations in the Far East attracted attention to this group of islands, (as little known as the interior of darkest Africa) and a ship sent by the United States Treasury for purposes of exploration, made the astonishing discovery that in this long chain, there is a succession of excellent harbors, so that it would be possible for a squadron flying the Stars and Stripes (should it be found necessary to send it to Chinese waters) to stop every night in a safe American anchorage until it reached Attu Island, nearly four thousand miles west of Puget Sound. From this dis-

than north. Attu, the westernmost island, is due west from the northern point of Maine. Copper, gold, coal and oil are found; the streams are stocked with salmon; it is claimed that the future cod fisheries of the world will be along these shores, and on Buldir Island, new fur seal rookeries were discovered—a fact, the importance of which will be understood when it is remembered that the revenue from the rookeries on the Pribilof Islands thus far has amounted to over \$50,000,000.

Of more immediate interest, however, is the fact that the chain of islands lies almost in the highways of commerce with the East. Our interest in the development of Asiatic trade is so great that it justified our retention of the Philippine Islands, as offering us a favorable position for exploiting that trade. But the value of an archi-



pelago stretching almost across the Pacific is incalculable. Most of the ships bound from Puget Sound to Yokohama, and some of those from San Francisco, go within sight of the Aleutian Islands, as it is shorter by the north circle route than it is straight across the Pacific. A straight line from San Francisco to Yokohama measures 4,791 miles, while a circular path skirting the islands is 4,536 miles in length. It is a daily occurrence, from the islands, to sight steamers moving between America and Japan.

Popular knowledge concerning the Aleutian Islands has for years been limited. They were thought to be composed of volcanic mountains and precipitous rocks, barren of vegetation, inhabited by a sparse population of Indians, and dangerous of approach on account of sunken and uncharted reefs. There was no inducement to venture to such uninviting regions. But, as the result of a recent voyage of exploration, made by a revenue cutter, the entire archipelago is to be remapped. The climate has been found to be mild, the land fertile, and the harbors spacious, safe, and open throughout the year. On Umnak Island, one harbor two miles long and three-fourths of a mile wide was found; and many are so deep and large that several fleets could enter at once. The warm Japanese current renders the Aleutian Islands more available as a place of residence than any part of the Atlantic seaboard north of Cape Hatteras.

The Aleutian Islands are more west

than north. Attu, the westernmost island, is due west from the northern point of Maine. Copper, gold, coal and oil are found; the streams are stocked with salmon; it is claimed that the future cod fisheries of the world will be along these shores, and on Buldir Island, new fur seal rookeries were discovered—a fact, the importance of which will be understood when it is remembered that the revenue from the rookeries on the Pribilof Islands thus far has amounted to over \$50,000,000.

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The accompanying photograph shows some of the natives listening, for the first time, to a phonograph, which doubtless seems nothing short of miraculous to them.

A Water and Land Boat.

AN original vessel has just been built in Denmark. It can travel on land as well as on water, crossing a neck of land on a railway track and then descending again into the waves. This curious boat, the *Swan*, runs between Lynghy and Foerum. Says the *Revue Scientifique*: "Lynghy is a town in the neighborhood of the four

lakes of Lynghy, Bagsward, Fure and Foerum. Only the first and third of these are connected; the others are separated by strips of land 300 metres [about 1,000 feet] wide, which is crossed by the *Swan*. For this purpose lines of piling extend into the water, far apart at first, but as they near the shore approaching until they will just admit the boat between them. The boat is thus guided until it strikes the line of rails on which it crosses the isthmus. Below the water line the boat has two pairs of wheels. As soon as these touch the rails a lever stops the shaft that drives the screw and starts another that drives these wheels. After crossing the land an inverse manipulation of the lever stops the wheels and the propeller begins to turn again. The car has turned back into a boat."

The Literary Digest.

Electric Temperature Indicator.

An unique electric system for indicating the temperature at a distant point has been devised by Mr. Robert G. Callum, of Washington, D. C. It is more especially designed for indicating the temperature of distant compartments or rooms provided for the storage of coal or other material, and for giving an alarm should the temperature of such compartments or rooms reach a point dangerous to the material or goods stored therein. To accomplish the ends sought, the inventor has provided two or more separately-adjustable thermostats which are connected in series in a normally closed electric circuit, said thermostats being located at the distant or guarded point, and each being adjusted and arranged to establish shunt-circuits at predetermined different degrees of temperature for decreasing or increasing resistance in the main circuit. Connected in said circuit at the point where the temperature is to be read is a galvanometer or other current-measuring device, which will indicate variations in the normal current or circuit. The adjustment and the resistance controlled by each thermostat being known, the position of the indicator of the current-measuring device will indicate the temperature at the distant point. By the employment of two or more separately-adjustable thermostats, the particular degrees of temperature to be indicated may be changed to suit particular requirements, and the failure of one thermostat to operate cannot interfere with a proper operation of the others.

In all prior systems wherein resistance in an electric circuit is varied by thermostatic devices for indicating by means of a current-measuring device variations in temperature at a distant point, no provision has been made for distinguishing between variations in resistance caused by the operation of the thermostatic devices and variations that may be caused by accidental derangement of the system or apparatus—as, for instance, an accidental crossing of wires—which might cause the current-measuring device to indicate a dangerous degree of heat when, in point of fact, the temperature at the distant point is normal. In order that it may be positively known whether variations in the indicating device have been caused by variations in temperature or by accident, provision is made for automatically opening the circuit at a predetermined temperature and again closing it at a different degree of temperature, so that it may be known that the system is in proper working order. There is also provided a device for registering the opening of the circuit, the temperature of said device serving as record proof of the character of subsequent variations in the indicating device.

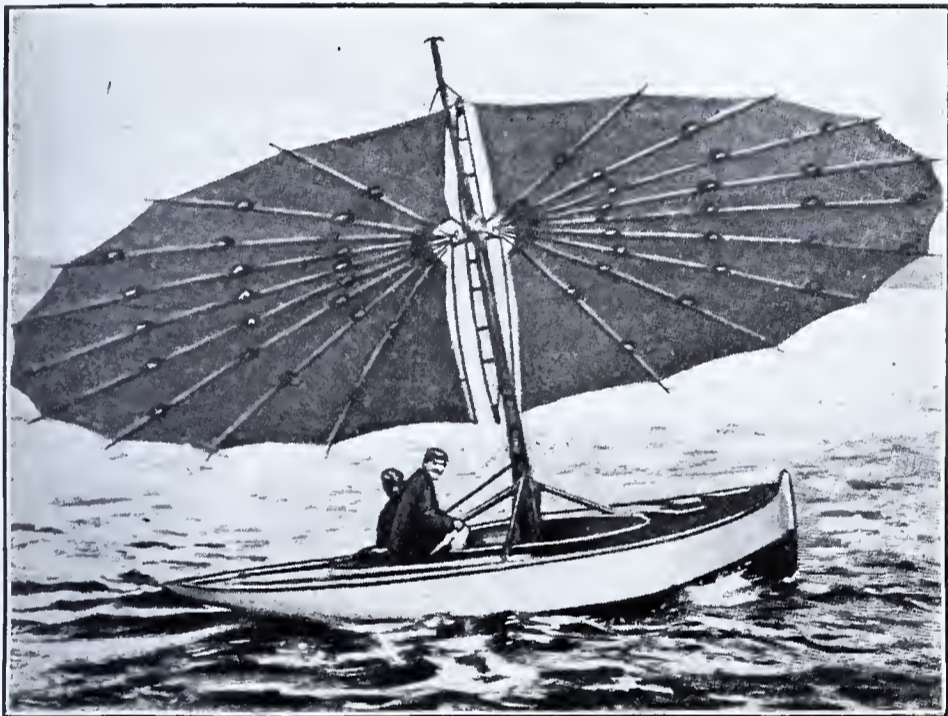
The Umbrella Sail.

AMONG the more interesting of recent inventions are two that have for their common purpose to improve the safety of navigation by sea. The first that has attracted the attention of yachtmen all over the world is the so-called cyclone, or umbrella sail, attempts to construct which have been made for years. To an Englishman belongs the credit, in this instance, of having solved the problem. A glance at the illustration will at once demonstrate the applicability of the name "umbrella," although to the uninitiated, the device seems clumsy and topheavy. It is said by experts, however, that with this type of sail, a small boat, which could not carry more than 200 square feet of canvas with an ordinary rig, can easily carry 360 feet, or nearly double the expanse. The increased speed of the boat is nearly in proportion to the increase in the canvas carried, while, it is said, the risk of being capsized is practically removed. This is due to the fact that the wind pressure on the cyclone

whole mast and sail may be rotated by means of a turntable, to which the mast is attached, and the mast is elevated and lowered through tackles. There is further a balance weight, which helps to elevate the mast and to balance its dead weight.

A boat in actual service in England is 17 feet on the water line, but carries a sail which measures 30 feet horizontally, and 16 feet up and down. The Thorneycrofts, the great English boat builders, expect to use it for row boats, canoes, and the like. The sail also serves as an immense awning, thus rendering locomotion more agreeable on hot days.

The other invention is one for rescuing passengers from shipwrecked vessels. It is called a "drifter balloon float," and is a simple apparatus intended to carry a rope from a vessel to land. A balloon, from one to two yards in diameter, is adapted to tow two pieces of timber joined at a right angle, which again tow a rope, the object of which is to connect the vessel with the shore. The balloon, or balloon float, properly speaking, is composed of three wooden hoops, covered with sail cloth, so as to enable it to stand heavy seas and contact with the rocks when landing. When not in use



sail has no effect whatever to incline the boat; or, to use technical language, the pull of the sail is at right angles to its mean surface, *i. e.*, in the direction of the mast. The action of the device is something like that of a kite held by a rigid string. If the mast were stepped quite on the lee side of the boat, the sail, obviously, would lift the lee side and list the boat to windward. On the other hand, if the mast were stepped on the weather side, thus lifting the weather side of the boat, it would inevitably list the boat to leeward. It follows that there must be a certain point at which, if the mast is stepped, there will be no tendency for the wind to careen the boat at all. This point happens to be slightly on the lee side of the centre line. When sailing in the boat, one becomes aware of a puff of wind only through suddenly accelerated speed, the sensation being similar to that imparted by the increased speed of engines in a steamer. In order to adapt the sail to winds from various directions, the

it folds up like an accordeon and occupies little space. When it is desired to employ it one draws the folds apart, and it inflates itself automatically; the valve is then closed and the balloon is fastened to the pieces of timber, which serve as a drifter. This last, when not in service can also be folded up into a small space. When in use, the parts are maintained in an open position by hooks and an iron bar. Its weight is about 60 pounds. The two devices are connected by a regulating arrangement by means of which, before the drifter is thrown into the water, an angle of from 60 to 90 degrees from the direction of the wind is obtained. When launched, the float draws the drifter to a distance with a speed and strength proportionate to the force of the wind. The stronger the wind, it is declared, the more efficacious the appliance. The drifter steers like a rudder.

The float is also provided with ropes, to which, in case of foundering of the ship, a dozen persons can cling and wait for help. They could even be carried to land by the float.

In recent trials off the coast of France, a model apparatus passed against the wind at an angle of 120 degrees.

Garnet Cutting.

ONE of the relatively unimportant but none the less interesting industries of the United States is that of cutting garnets. The most famous garnets are found in Bohemia, but beautiful specimens have been discovered in Arizona, New Mexico, North Carolina, Virginia, and other portions of the United States, some of which almost rival the ruby in splendor of coloring. These stones are usually cut and polished in the cities of the North, not a few foreigners being employed in this work. The accompanying illustration shows garnet-cutters at work.

Mining for garnets is simple. The earth is removed until the stratum containing the stones is reached. Unless this stratum is very rich, the

The gem then passes to the polisher, who treats it in a similar manner on a disk made of copper, tin or bronze, smeared with a paste made of rotten stone instead of emery. Round or half round smooth stones are polished on wooden disks, and are the work of especially skillful hands. They are generally used for the centers of larger pieces of jewelry.

Large garnets are rare and expensive. Large stones of inferior quality are frequently found, but they become black in fire, and do not recover their color when cooled, as the genuine garnet should.

Garnets were formerly set in but one way. Upon a metal base narrow strips of serrated metal were soldered. These teeth were then bent over to



excavation is not deep, and a shaft and galleries are seldom required. The earth is then washed and the stones sorted through a sieve.

In cutting garnets, an expert places the raw stone upon a leaden anvil, and with a leaden hammer removes all superfluous or faulty parts, breaking the stone always in the direction of its cleavage. The stone then passes to the cutter. The machinery used by the cutter is very simple. A horizontal disk of lead smeared with emery paste, which revolves upon a table, is turned by a hand wheel. The garnet is held upon the disk until a flat surface is produced. This flat surface is fastened with cement to a piece of wood shaped like a thin cigar. An apprentice now takes the stone, and by means of the revolving disk, shapes or rounds it. It is now ready to have the facets cut. In order to produce facets of equal size, shape and angle, a so-called quadrant is used. This quadrant holds the cigar-shaped piece of wood on the revolving disk at any desired angle, and admits of its being turned so that several facets may be cut. After the top of the stone is cut, the cement is softened over a lamp, the stone reversed, and the cutting completed.

hold the gem in place. From Oriental jewelry, the method of boring a hole for each stone was learned. Some years ago, a Prague jeweler soldered to the metal base little pins, between which he fastened the gems. This proved not only durable, but allowed the utmost variation of form, so that the invention may be considered the foundation of the present industry.

It may not be generally known that there are various shades of garnets. One is accustomed to associate only one color—a deep red—with the stone; but there are also violet, yellow, blue, green, and even black garnets. The last is called melanite, and is used for mourning jewelry. The green, or gooseberry stones, are prized more for their rarity than for their appearance. These are found large in Siberia. Garnets are also present in Greenland, Australia and India. The Indian stones are called almandine, and upon looking through them, the color approaches that of the amethyst. The so-called Cape rubies, are nothing but garnets; and the same is true of Uralite emeralds. Garnets, when cut with a convex base and a concave upper surface, are known as carbuncles.

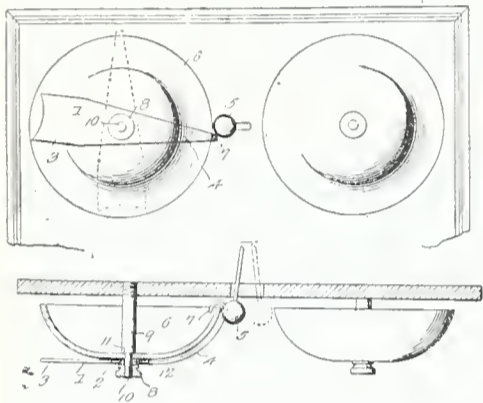
CLEVER NEW PATENTS.

Telephone Signal.—Vehicle Brake.—Grain Separator.—Automatic Damper Regulator.—Window Cleaner.—Box Fastener.—Buckle.

Telephone Signal.

A device that will fill a long felt want has been patented by Mr. George K. Jackson, of Reece, Kansas, who has assigned a one-half interest to Mr. Abner Howard, of Eureka, Kans.

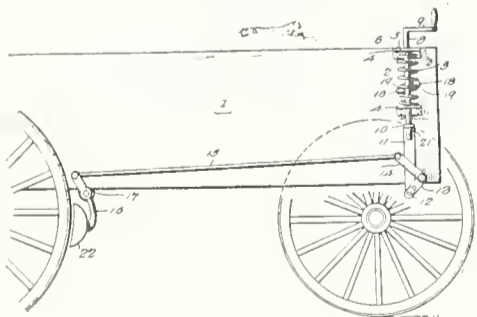
The device is an indicator adapted to be applied to the call bell of a telephone or like instrument, and so arranged that when the bell is operated, the indicator will move. The result is that if a person is absent when a call occurs, the annunciator will inform him of such call upon his return. It will be apparent from the



accompanying illustration that the device is an extremely simple one. An arm 1, is employed which is pivoted between its ends upon the belt post. One end of this arm is made larger and heavier than the other, the latter being in the form of a hook 7, and surrounds the peripheral edge of the bell. The hook end is adapted to be engaged beneath the clapper. It will therefore be apparent that when the clapper is operated, the arm will be released and swung to an upright position, as indicated in dotted lines, thus affording a visual signal that a call has been made. Instead of employing a weighted arm, the inventor also proposes to use one operated by a spring, the device being substantially the same as that shown, but without the larger or weighted end.

Vehicle Brake.

Washington M. Mason, of Byrd, Tenn., has devised a unique wagon-brake, or more particularly, means for operating the same. The brakes may be of any desired pattern, and are connected by a rod 15, with a bell crank lever 14, attached to one side of the vehicle body. Above this bell



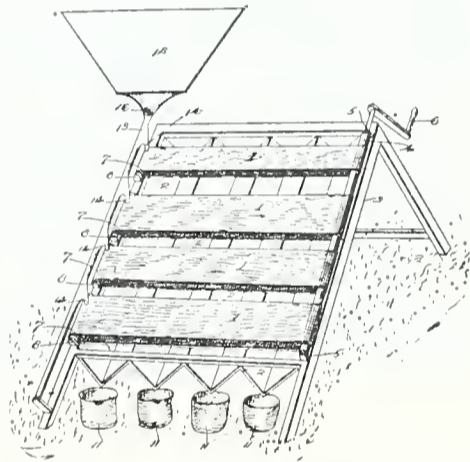
crank lever are secured spaced outstanding plates 4, between and to which is attached a spiral 3. A shaft 5, also passes through the plates and longitudinally through the spiral. The upper end of the shaft has a handle crank 9, while the lower end is revolvably coupled with the bell crank lever. Rollers 19, secured to the shaft on opposite sides of the same engage the whirls of the spiral. It will therefore be apparent that when the handle crank is turned in one direction, these rollers will raise the spiral,

thereby drawing upwardly upon the bell crank lever and clamping the brakes upon the wheels. They are self-locking so that latches, dogs, and the like are dispensed with. A reverse movement of the handle crank serves to unbrake the wheels.

An advantage which seems to be present resides in the construction of the spiral, which being slightly yielding permits the brake shoes to "give" and thus accommodate themselves to the unevenness of the wheel surfaces against which they bear.

Grain Separator.

The accompanying cut affords a very good idea of a grain separator invented by a prominent resident of Rinkerton, Va., Mr. Robert S. Rinker. An inclined frame is employed which supports a number of longitudinally disposed inclined troughs 2. Over these troughs are arranged a series of transverse spaced and inclined belts 1, operated from a single roller having a handle at one end. At the upper end of the frame is supported a hopper 12, from which leads a grain-conducting pipe or conduit having delivery spouts 14, located over the belts and arranged to discharge seeds on the latter near their upper sides and near the front ends of thin upper leads. Thus, the seeds in rolling more or less slowly according to their shape will be discharged from the belts or aprons into the troughs beneath the same, the more nearly spherical seeds being discharged first,

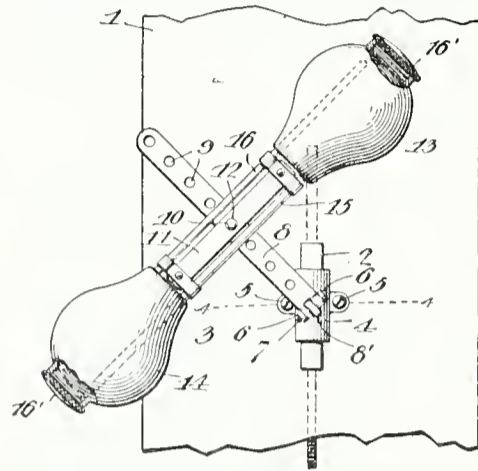


owing to the greater facility with which they roll down the inclined surfaces of the belts. Thus cockle, which is substantially spherical in form, will be first discharged. Wheat, which is less spherical than the cockle will be next discharged. Rye, which is more cylindrical in form and more flattened on opposite sides than wheat, will find its way into the third trough, while oats will be discharged last and will gravitate into the rearmost trough. Suitable reservoirs 11, placed at the open and lower ends of the various troughs receive the separated grain.

Automatic Damper Regulator.

A unique device for automatically regulating dampers has been invented by Mr. Henry Fatic, of Middletown, Ind. The device is applicable to any ordinary damper, and is shown in this instance applied to one located in a stove-pipe. To the usual handle of such a damper is attached a collar 4, carrying a crank arm 8, provided with a series of openings therethrough. Adjustably secured to this crank arm is a cross bar supporting at its ends a pair of receptacles 13 and 14, having

screw caps. The receptacles are connected by tubes 15 and 16, one of which extends to the outer end of each and terminates at the inner end of the other. The damper is shown in open position in the illustration, and it will be noted that the arm attached thereto extends upwardly. Water or other material is placed in the upper receptacle and can gravitate down the lower pipe into the lower receptacle, its place being taken by the air driven from the lower receptacle, through the upper pipe into the upper receptacle.

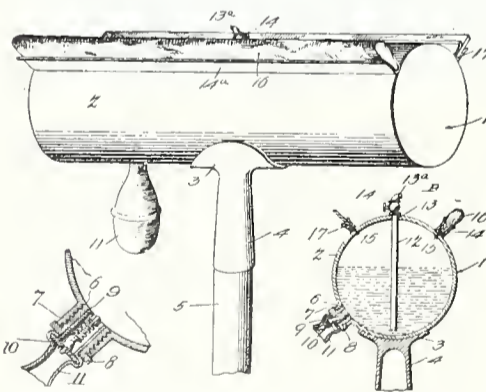


When the weight of the liquid or material in the lower receptacle becomes great enough to overbalance the device, the arm will swing, thereby carrying the damper to a horizontal or closed position and cutting off the draft. With this arrangement, a fire may be allowed to burn for a certain length of time, and the drafts will be automatically closed down without further attention.

Window Cleaner.

A new window cleaner of the fountain type has been patented by Mr. William Mable, a well known inventor of Fort Collins, Colorado, who has assigned a one-half interest to Mr. Robert J. Andrews, of the same place.

A cylindrical reservoir 2, is mounted upon the upper end of a handle and is provided along its upper portion with longitudinally disposed sets of



spaced flanges 14a and 17. Between the flanges of one set is secured an absorbent cleaning pad 16, while the other set constitutes a fastener for a rubber drying strip. A pipe 12, leads from the lower portion of the interior of the reservoir through the top thereof, and has an offset nozzle 13a turned toward and above the cleaning pad. A rubber bulb 11, has valved communication with the interior of the reservoir and constitutes means for forcing air into the same.

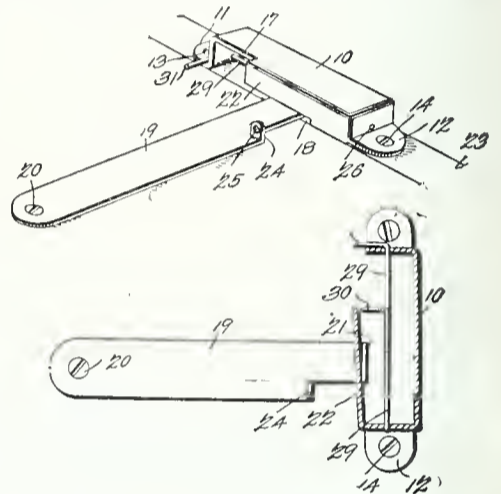
In use, the reservoir is first partially filled with water, and the air is then pumped into said reservoir. The device is then placed against a window, whereupon opening the valve of

the discharge pipe, water will be forced from the reservoir against the window above the cleaning pad, so that if the device is now reciprocated, such window may be thoroughly washed. The water is then shut off, and the device reversed so as to bring the drying pad into operation.

Box Fastener.

A simple, inexpensive and easily operated device, which may be employed for securing covers to boxes, fastening doors and the like, is described in a patent granted to Mr. Albert Bennett, of Puyallup, Washington, a one-half interest in the patent having been assigned to Mr. John Mugford, of the same place.

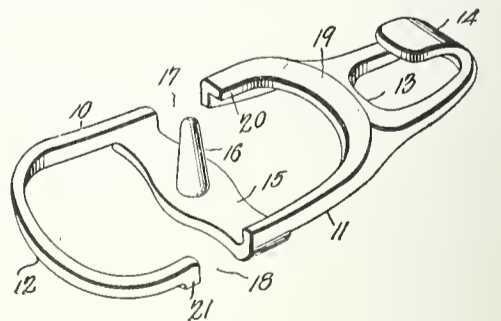
A casing 10, is employed which is adapted to be secured to a box wall or a door frame, and has an opening at one end 17, from which leads a contracted recess 18. A hasp 19, pivoted to the door or box cover, has a projection adapted to enter the



cavity. A bolt 29, formed of a single piece of wire is rotatably secured within the casing, and has an offset loop arranged to engage behind the hasp to hold the same in the casing. If desired, the two parts forming the fastener may be sealed, this latter feature being of importance when employed on boxes used for transportation purposes.

Buckle.

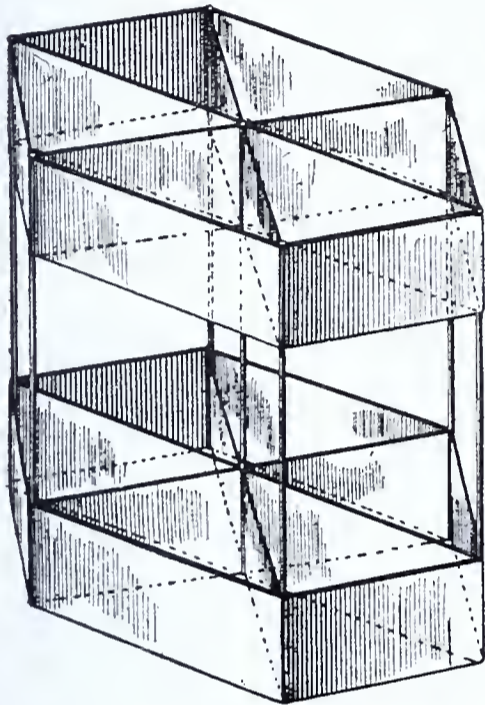
A buckle patented by Mr. George W. Moores, a well known inventor of New Orleans, La., presents several interesting features. The object of the invention is to simplify, cheapen and improve the construction of harness buckles by dispensing with the loose or pivoted tongues, and at the same time providing means whereby straps may be inserted laterally, thus obviating the necessity of threading them through the buckle frame. A cross bar 15, is employed having an up-



standing fixed tongue or stud 16, at its central portion. From the ends and on opposite sides of the cross bar, extend reversely arranged hook portions, leaving open entrance throats 17 and 18, to permit the introduction of the straps laterally into the frame. From one end of this frame projects a backwardly curved hook 14. Suitable flanges or ribs are provided that serve to prevent the detachment of the straps after they are in place.

ALEXANDER GRAHAM BELL'S KITE.

One of the absorbing topics in scientific circles at present is the question of aerial navigation. We have heard of the successful use of dirigible balloons, the most famous of which are those of Santos-Dumont, but the aim now in view is the elimination of the unwieldy gas bags with their enormous resistance and their tremendous surface exposed to the winds and air currents. Professor Langley, of the Smithsonian Institute, of this city, has for years been studying and experimenting with aeroplanes in the form of wings, but has met with failures up to the present time, as described in the INVENTIVE AGE for January 1904. It has also been known for some time that Professor Alexander



Graham Bell, of Washington, D. C., famous as the inventor of the telephone, has been at work in this line, and has been experimenting secretly in the wilds of Cape Breton with some sort of kite mechanism, the nature of which, however, has been kept a mystery.

It has been now announced that the trials have proven entirely successful. Following on the heels of this announcement is an interesting feature in the shape of a patent just issued to Prof. Bell on a kite termed by him an "Aerial Vehicle." An examination of the illustration of the same herewith presented clearly indicates that this aerial vehicle is merely a modification of the box or Hargrave kite, named after its inventor Laurence Hargrave. Professor Bell acknowledges this and thus describes his machine:

"This invention has reference more particularly to the construction of aerial vehicles, and is based upon experiments conducted with kite structures.

Prior to this invention and largely through the investigations of Laurence Hargrave the advantages of the cellular box-kite have been made widely known. Although multicellular kites have been constructed upon the Hargrave principle, it has not been observed or pointed out that they possess any substantial advantage over a kite composed of two cells only.

The typical Hargrave kite is composed of two rectangular cells separ-

ated by a considerable space and connected together by a light framework, the cells being disposed in the same horizontal plane. A limit to the lifting power of such kites is quickly reached, since mere enlargement of the dimensions of the parts does not proportionately increase the lifting power. On the contrary, such enlargement increases the ratio of weight to surface exposed to the action of the wind inasmuch as weight increases as the cube of the dimensions, while the surface increases only as the square of the dimensions. Furthermore, the rectangular cell is structurally weak and easily collapsed or distorted, giving rise to the necessity for internal bracing. This bracing adds to the dead load and (owing to the shape of the cell) is necessarily so disposed as to increase the resistance of the wind. These objections have been partly overcome by resorting to a triangular cell—that is to say, a cell of pentahedral form, triangular in cross-section, which is self-braced in the direction of its plane. In such a cell each oblique plane may be regarded as the resultant and equivalent of its horizontal and vertical components—i. e., as presenting a supporting (horizontal) surface and a steadying (vertical) surface. It has heretofore been proposed to construct a kite or aerodrome composed of two such triangular cells separated by an open space, as in the Hargrave box-kite. This form of structure is subject to the law above referred to—namely, that an increase of dimensions increases the ratio of weight to surface. I have found, however, that advantageous results may be obtained by utilizing the triangular cell as a unit or element, and building up structures of large size by combining a number of these units or elements. Triangular cells are specially adapted for combination into a compound structure in which the aero-plane surfaces do not interfere with each other. When the edges of two or three of the elements coincide, a single bar or stick will suffice, thus dispensing with the weight of one or two bars or sticks."

The illustration shows in perspective (the structure standing on end) a kite of hexagonal form composed of elements triangular in cross-section. This compound kite is composed of two hexagonal cells and separated by a space, the interspace being considered an important feature of all kites constructed on this principle. Obviously the principle may be extended in the building of kites composed of a greater number of compound cells separated by intervening spaces, and the triangular elements can be combined into structures of various outlines.

A public exhibition of the improved kite was recently given near Washington, D. C., by Professor Bell, before the National Geographic Society. Nothing of a startling nature was developed however, as only small kites were used and practically the only fact demonstrated was that the kites would fly if there was sufficient wind. Their elevation was secured by the old fashioned boyhood method of attachment to a long cord and running with them. When the wind dropped, the kites dropped with it. It was shown that the frame can be made strong enough to support a man, but this is a minor feature unless the elevating force is equal to it. Professor Bell announced however, that he had constructed kites of sufficient size to sustain a man, but this amounts to little, as the same has been done with the old fashioned flat kite.

While it is probable that the new kite has greater sustaining power than the old types and the Hargrave structure, it yet remains to be seen how the same is to be employed for navigating the air or carrying human freight through the boundless realms of upper space.

IMPORTANT COURT DECISIONS

DECISIONS OF THE U. S. COURTS.

Supreme Court of the United States.

WARNER v THE SEARLE AND HERETH COMPANY.

Decided November 30, 1903.

1. TRADE-MARKS—APPEAL TO SUPREME COURT.

Where the infringement of a trademark registered under the act of Congress was charged, *Held* that the court had jurisdiction on the ground that the case arose under a law of the United States and that there was a right of appeal to the Supreme Court.

2. SAME—REGISTERED MARKS—FOREIGN COMMERCE—INFRINGEMENT.

Registered trade-marks are by the wording of the law strictly limited to lawful commerce with foreign nations and with Indian tribes, and such mark can only be infringed when used in that commerce without right by another than its owner.

3. SAME—SAME—SAME—JURISDICTION OF FEDERAL COURT.

Where diverse citizenship does not exist and the statutory amount is not in controversy, the jurisdiction of the Federal courts in the matter of registered trade-marks can only be maintained when there is interference with commerce with foreign nations or Indian tribes.

4. SAME—SAME—FOREIGN COMMERCE MUST BE SHOWN BY BILL.

Where it is sought to enjoin the wrongful use of a registered trademark, it should be made to appear that the trade-mark was then being used in commerce with foreign nations or Indian tribes and that such use was being interfered with without right by defendant.

Court of Appeals of the District of Columbia.

IN RE FREEMAN,

Decided February 2, 1904.

1. DESIGNS—ANTICIPATION—HOSE SUPPORTER.

Held that the appellant's design for a hose-supporter is lacking in patentable novelty in view of his own prior patent and also in view of patents granted to others upon devices differing from the appellant's only in mechanical details.

2. SAME—PATENTABILITY—DIFFERENCES IN DETAILS—SUBSTANTIAL DIFFERENCES NECESSARY.

The change or omission or addition of a few minor details would not justify the multiplication of design patents even though the designs may readily be distinguished from each other by one or more features. Substantial differences are required to render one device patentable over another as a design.

3. SAME—SAME—TESTED BY ORNAMENT MECHANICAL DIFFERENCES IMMATERIAL.

The novelty of a design must be judged by the test of ornament, and while the final merit of ornamentation may depend upon the harmonious blending of small details, mechanical differences which may make a vast difference in the operativeness of the devices may make no appreciable difference between the devices as designs.

4. SAME—SAME—MECHANICAL AND DESIGN INVENTIONS DISTINGUISHED.

The test of patentable novelty in the case of mechanical inventions and in the case of designs is different, owing

to the different nature of the two things. Detail is of little consequence in designs, and it may be all important in mechanical inventions.

5. SAME—DRAWING OF DESIGN—DESCRIPTION UNNECESSARY AND CONFUSING.

A picture of the design serves to convey a greatly more adequate idea of the design than any verbal description could possibly do, and in the presence of the picture a superadded verbal description is generally useless and oftentimes confusing.

6. SAME—SAME—SAME—DESCRIPTION OMITTED.

The ruling that the descriptive material in the specification of design cases should be reduced to a minimum or omitted *Held* to be the dictate of reason, common sense, and common experience.

COMMISSIONER'S DECISIONS.

EX PARTE FRASCH.

Decided March 22, 1904.

1. DIVISION—REJECTION—APPEAL TO EXAMINERS-IN-CHIEF.

A requirement for division of an application is to be regarded as a rejection and is appealable to the Examiners-in-Chief in the first instance.

2. SAME—APPEAL TO EXAMINERS-IN-CHIEF—STEINMETZ v. ALLEN.

The decision *Steinmetz v. Allen* has announced no new principle controlling the determination of the question whether inventions are independent and should be divided, but has merely announced that the question is appealable to the Examiners-in-Chief in the first instance.

3. SAME—RELATED AND DEPENDENT INVENTIONS—VALIDITY OF CLAIMS NOT INVOLVED.

In determining whether or not division should be required the question to be decided is not whether the claims would be sustained as valid if granted in one patent, but is whether the inventions claimed are related and dependent.

4. SAME—INDEPENDENT INVENTIONS—PATENT VALID—DISCRETION OF PATENT OFFICE.

The courts sustain patents covering two or more independent inventions: but it does not follow that this Office must permit independent inventions to be claimed in one patent. The question of division is a matter left largely to the discretion of the Patent Office.

EX PARTE PICKLES.

Decided March 30, 1904.

DIVISION—ACTION ON MERITS NOT MADE—PRACTICE.

Where division is required it must be settled before the Office will examine the merits of each separate claim to determine the question of patentability. An examination of two or more independent inventions will not be made in one case.

The "Cosmopolitan's" fight for a Parcels Post in the United States has made a decided impression throughout the country. In the April issue the editor continues his forceful, telling arguments, showing that one cent a pound would be to the government a profitable rate for postal parcel delivery.

THE INVENTIVE AGE contains sound advice to inventors and patentees. For lack of such advice many have lost money. Subscription, one dollar a year.

MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been procured
through the Patent Soliciting Office
of E. G. Siggers, Patent Lawyer,
Washington, D. C.

William E. Niles, Chicago, Illinois.
Brace for Steam Boilers and the like.

—This brace, while very simple and inexpensive, has great strength to withstand longitudinal strains, but is so constructed that it will yield to any lateral vibration of the body braced thereby. The main shank of the brace may be formed of a rod, and either one or both ends is provided with eyes through which are passed securing devices in the form of staples that may be riveted to the body of the boiler. This interlocking engagement therefore permits the lateral movement of the brace without straining the same.

William Craine, Brookfield, N. Y. Silo.—As is well known, silos are employed for holding fodder, and the fermentation thereof creates tremendous outward pressure on the walls, thus requiring a powerfully built structure to withstand the same. Ordinarily these silos comprise upright staves bound together at suitable intervals by bands. In this invention upright staves are still employed, but these staves are surrounded by an outer sheathing in the form of a continuous overlapping hoop structure broken only by the doorways, and securely nailed to the inner vertical staves. On either side of the doorways are secured upright beams connected by tie rods constituting ladder rungs. The openings or doorways are contracted outwardly, and the doors, being wedge-shaped, fit tightly against the same so that the pressure of the material within maintains said doors securely closed.

Robert H. Gray, Lexington, Ky. Conveyor.—This invention, while particularly intended for that class of pumps employing an endless chain, is useful in many relations. The chain is composed of links, each link comprising a sheet metal plate, the opposite ends of which are doubled and have secured therein pivoted eyes of wire. The bucket is in the form of a conical receptacle made of sheet metal and located against one side of the link plate. A fastening device secures the bucket to the plate, and consists of a wire looped about the closed tapered end of the bucket and passing through one of the doubled ends of the plate, thence extending longitudinally of the plate, and having its terminals passing through the other doubled end and the adjacent portion of the receptacle.

Mrs. Harriet G. Northfield, Minneapolis, Minn. Supporter.—The present invention relates to means for supporting breech cloths, and the object is to provide an article of this character that will constitute an efficient supporter, and will impart an even tension without regard to the position assumed by the body of the wearer. It comprises a pair of shoulder straps, the ends of which are connected by inelastic cross braces. Elastic sections are also secured to the ends of the shoulder straps at the juncture of the cross braces. These elastic portions are in the form of loops that carry suitable fastening devices in the form of pins. The device is a very simple one and at the same time is strong, for the joints are re-inforced by the cross braces.

Emanuel Cbainey, Florence, Wis. Two patents. Saw Gummer—Mowing Machine.—The saw gummer is one of the most ingenious little devices of this character yet invented. A simple form of frame is employed which is adapted to be placed astride, and clamped upon, the saw blade. A swinging frame is pivoted to the main frame

and constitutes a support for an arbor that is rotatably journaled therein and has also a longitudinal movement. The arbor carries a rotary cutting disk and is driven from gearing mounted on the main frame. A guide secured to the main frame properly positions the structure with respect to the teeth of the saw.

The improvement in mowing machines embodies a clever anti-frictional mounting for the cutter bar of a mowing machine, and a simple form of operating mechanism, arranged to permit the easy detachment of the cutter bar, for sharpening or repair, and designed to overcome the counteraction between the cutter bar and the frame of the machine, thus eliminating the usual pounding and the consequent wear on the various elements of the machine. Afforded a solid foundation on the shoe, from which the cutter bar extends laterally, is a swinging gear-casing in which is mounted a short vertical crank shaft having connection with a pitman normally engaging a stud at one end of the cutter bar, but arranged to be withdrawn from engagement with said stud by the swinging of the gear casing. The casing also carries suitable gearing which operatively connects the vertical crank shaft with an extensible shaft, geared to the driving wheels of the mower, and arranged to accommodate itself automatically to the movement of the shoe and cutter bar.

Isaac N. Williams, Foltz, Indiana. Fence.—The feature of this invention is the means for locking the line and stay wires together. An upright stay is employed, across one face of which the line wires extend. This stay has a plurality of sockets in one of its side faces and is located contiguous to the line wires. The locks each consist of a substantially U-shaped body that surrounds the stay and covers the socket, the covering portion being bent inwardly and engaging in such socket. A pair of hooks are formed at the ends of the body and detachably engage over the line wire, while a wedge-key is inserted between the legs of the body and the stay and line wires. A lock as thus constructed is adapted to be supported on the stay and engaged in the socket thereof before its attachment to the line wire.

Milton B. Jones, Meridian, Miss. Hay Press.—This invention discloses a novel power mechanism for hay presses, and includes simple yet positive means for increasing the force applied to the plunger in proportion to the increase of the resistance opposed to the forward movement of the plunger by the material being pressed. At the rear end of the plunger rod is connected a pitman provided with a wrist received within a cam-way formed in the power head. This cam-way is defined between the walls of a substantially oblong opening and the edges of a sigmoidal block centered within the opening, the concave portions of the block being disposed adjacent to thrust notches located at diametrically opposite corners of the cam-way. The arrangement is such that as the head rotates, the wrist will engage one of the notches and the plunger will be urged forward with a constantly increasing leverage. When the end of the plunger stroke is reached, the wrist will automatically disengage itself from the notch, and as the plunger is retracted by its spring, the wrist will travel along one face of the sigmoidal block and will be guided thereby into engagement with the next notch of the power head, preparatory to a repetition of the plunger stroke.

Peter V. Blue, inventor; The Neer Manufacturing Company, assignee, St. Paris, Ohio. Hay Tedder Attachment.—The attachment is complete in itself and is designed for use in connection with various types of mowers. When in use it performs the function of a tedder without interfering with the operation of the mowing machine,

and serves additionally to equalize the side draft occasioned by the location of the cutter bar beyond one side of the machine.

The tedder comprises a beam arranged to straddle the seat spring of the mower and having at its front end a clamp secured to the tongue. At the rear end of the beam is supported a swinging yoke formed with bearings for the driving shaft of the tedder, which is geared by a sprocket chain to one of the carrying wheels of the mower. From this yoke is also swung the tedder frame proper in which the tedder forks, operated by a crank shaft geared to the driving shaft, are mounted.

Mrs. Edith L. Allen, Mineral Point, Wis. Stove Mat—Mrs. Allen's patent discloses an insulating mat or covering designed to be applied to the top of a stove to prevent such radiation of heat as would be objectionable to a person engaged in cooking, and to serve additional purpose of economizing fuel and preventing the sooting of pans and other culinary receptacles which would otherwise soil the table linen. Several forms of the invention are illustrated, but that which is preferred is nothing more nor less than a sheet of asbestos which covers the top of the stove and is cut out to accommodate the stove lids and the pipe, the lids being preferably covered by asbestos lid covers constituting removable mat sections fitted into the openings in the mat.

David Cline, Scranton, Pa. Combined Heater and Steam Generator. Two patents.—The structures shown in these patents constitute an inexpensive heating apparatus which is exceedingly economical in the consumption of fuel and arranged to be regulated to effect the generation of steam or the heating of air to be supplied, for instance, to a hot air heating system; the steam generating and air heating features of the apparatus being capable of use either independently or jointly. The structure shown in one of these patents includes a casing, a fire box therein, horizontally disposed direct and return flues disposed endwise of the casing to convey the products of combustion to the chimney, upper and lower side chambers formed in the side walls of the casing opposite the flues, and hot air tubes extending transversely through the casing and exposed within the direct and return flues, to heat the air passing through the flues to a hot air heating system. At the end of the casing opposite the fire box is located a steam generator or boiler having direct and return tubes which communicate with the direct and return flues. By an arrangement of dampers, the boiler tubes may be opened to the products of combustion, or may be closed if it is not desired to generate steam.

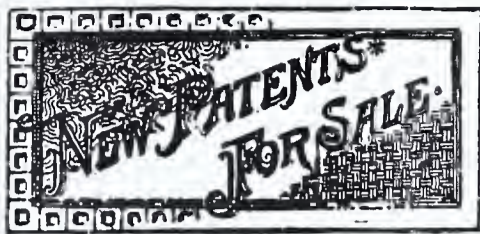
The structure shown in the other patent includes a combined cooking and heating apparatus, in addition to means for generating steam or heating water designed to be supplied to steam or hot water heating systems extending throughout the building. In a suitable casing having the general characteristics of a large cooking range is formed, at the rear end thereof, a vertical extension in advance of which is a rear smoke chamber. Within the casing is a boiler comprising a vertical chamber extended upwardly into the casing extension. The boiler also comprises a horizontal chamber leading inwardly from the vertical chamber and three longitudinal tube chambers. At the front of the casing are arranged fire boxes, in rear of which are ovens located between the tube chambers of the boiler. Direct tubes pass through the vertical boiler chamber in rear of each oven, and other direct tubes extend lengthwise through the tube chambers and through the vertical boiler chamber, return tubes being located within the upper end of the vertical chamber and opening into the rear smoke chamber. At the front

ends of the tube chambers are front smoke chambers in communication with the tubes, the passage of the products of combustion into these smoke chambers being controlled by doors. In rear of the ovens is a smoke chamber arranged to convey the products of combustion to the chimney, and the various chambers and passages are equipped with dampers to provide for direct or indirect draft.

Homer M. Sackett, Telluride, Colo. Two patents. Loading Apparatus for Two Bucket Tramway.—Rock and Ore Crusher.—The first invention relates to a loading apparatus for two bucket tramways, and consists in providing a bin into the bottom of which is fitted and secured a double hopper having chutes leading in opposite directions to permit the loading of either of two buckets suspended from their cables located at opposite sides of the loading station. The lower ends of the chutes of the hopper are closed by valves connected to the swinging walls which form continuations of the hopper bottoms when the valves are swung to their open positions. The weight of the hopper is sustained by a supporting structure equipped with stops for limiting the movement of the valves, and the valves are operated by hand levers.

The second invention relates particularly to machines employed for use in crushing samples. In assaying samples of ore, great care is, of course, necessary in order that the true results be obtained and, as many samples pass through the same crusher, there is always danger that some of the material from one may remain, to become mixed with the next, unless the crusher is thoroughly cleaned after each use. Heretofore, this has been a comparatively difficult operation, but in Mr. Sackett's machine, the cleaning may be readily accomplished, as he makes the jaws removable so that every part can be readily reached and thoroughly brushed, besides there are no cavities in which the material can become deposited in any quantity of consequence. The frame of the machine is in the form of a hollow box, the opposite side walls of which are provided in their upper edges with inclined seats. A stationary jaw is hung from the side walls and has outwardly extending inclined lugs that engage in the seats. A handle, secured to the upper end of the jaw, affords convenient means for removing and replacing the same, and a button pivoted upon the end wall of the frame is adapted to bear upon the upper end of this stationary jaw and hold the same in place. Simple mechanism is employed for supporting and operating the movable jaw, which jaw is also made removable.

Orrin M. Sackett, inventor; Homer M. Sackett, assignee of entire interest. Telluride, Colorado. Grip for Cables and the like.—The invention relates to grips for connecting mine cars, buckets and the like to cables or similar driving elements, the object being to provide a simple article which not only has a powerful gripping action, but also has considerable freedom of movement to allow for the sag and displacement of the cable. In a suitable boxing, which is adapted to be secured to the frame of a bucket or to a car, is journaled a stationary jaw having a stop that engages shoulders on the casing or body, whereby its movement is limited. Within the stationary jaw is slidably mounted a movable jaw, the stem of which projects beyond the body, and is surrounded by a coiled spring enclosed within the stationary jaw. The rear end of the stem has pivoted thereon a cam provided with an arm that extends over the body, where it can be readily operated. There are several structural features of advantage, besides those above outlined, which permit the adjustment and separation of the parts for the purpose of allowing for wear and renewal.



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A NEW TRADE-MARK LAW NEEDED.

If there were no evidence that the Trade-Mark Law, under which trade-marks are registered in the Patent Office, is defective and should be immediately amended, it is shown sufficiently clear by the decision of the Supreme Court of the United States in *Warner v. Searle & Hereth Co.*, reported in 107 O. G., 1975, the syllabus of which decision is printed in another portion of the AGE.

This was a case where the complainant had adopted a certain arbitrary and fanciful mark termed "Pancreo-pepsin" upon bottles and packages containing a certain medicinal preparation, and alleged he had sold large quantities thereof throughout the United States and in commerce with foreign countries, and on December 26, 1882 registered his trade-mark in the Patent Office and obtained a certificate of registration according to law. He complained against the defendants that they had violated his rights by counterfeiting, copying and colorably imitating the trade-mark registered. The defendants made a specific denial and alleged that the word "Pancreo-pepsin" was not a proper subject for the registration of a trade-mark, and charged that if it was not deceptive it was purely descriptive, being a mere compound of the ordinary names of the ingredients. Furthermore, they alleged that in adopting the name they had only followed common usage, where it was desired that the name should be generally descriptive of the compound to which it was applied.

The Circuit Court held that the trade-mark was valid and had been infringed and granted an injunction. The Circuit Court of Appeals reversed the decision of the Circuit Court and remanded the case with direction to dissolve the injunction and dismiss the appeal. On appeal the Supreme Court affirmed the decision of the Court of Appeals.

As is well known, before an applicant can register a trade-mark in the Patent Office he must file a declaration asserting that said mark is used by him in commerce with a foreign nation or an Indian tribe, this being occasioned by the fact that the United States trade-mark law makes it a condition precedent to the grant of registration by the Patent Office that such allegation should be made by the applicant. It follows then that the trade-mark, so far as the registration of the Patent Office is concerned, is only effective in commerce between foreign countries and Indian tribes, and that the greater and more valuable interstate commerce is left unprotected. It may not be amiss at this point to refer to the past history of trade-mark legislation.

In July 1870, Congress passed a law for the registration of trade-marks in the Patent Office. In October, 1879, the Supreme Court of the United States in "The Trade-Mark Cases" (100 U. S. 82) ruled that the act of July 8, 1870, was invalid for want of constitutional authority, inasmuch as it was so framed that its provisions were applicable to all commerce, and were not confined to that which was subject to the control of Congress. Mr. Justice Miller, speaking for the Court, said that the question,

"Whether the trade-mark bears such a relation to commerce in general terms as to bring it within Congressional control, when used or applied to the classes of commerce which fall within that control, is one which, in the present case, we propose to leave undecided."

As this decision left the Patent Office without any authority to grant certificates of registration of trade-marks, an act was passed on March 3, 1881, entitled "An act to authorize the registration of trade-marks and protect the same." This is still in force. As already stated, the statute provides that—

"No alleged trade-mark shall be registered unless the same appears to be lawfully used as such by the applicant in foreign commerce or commerce with Indian tribes."

Just why Congress should have limited the trade-mark act in this way has never been satisfactorily explained, for it is clear that Congress had as much right to provide for the registration of marks used in interstate commerce, as it had to register marks employed in commerce with the Indian tribes or foreign countries. It is certain that Congress has no right to pass a law registering trade-marks used within a state only. For instance, if a druggist uses a trade-mark on his preparations and his trade does not extend beyond the city or state within which he is located, Congress would have no right to pass a law which would give the privilege of Federal registration to the druggist. It is equally clear that Congress has a right to grant registration to trade-mark owners whose trade extends between states.

In the bill which is now before Congress to revise the laws of the United States relating to trade-marks, and which was referred to extensively in the October 1903 issue of the AGE, this fact is recognized, and it is provided

"That any person claiming to be the owner of a trade-mark used in commerce among the several states or in commerce with foreign nations, or with Indian tribes, may obtain registration therefor upon complying with the regulations prescribed in the proposed act."

The necessity for the early consideration of the said bill is shown by the fact that the Supreme Court has decided in the case hereinbefore referred to that—

"Registered trade-marks are by the wording of the law strictly limited to lawful commerce with foreign nations and with Indian tribes, and such mark can only be infringed when used in that commerce, without right, by another than its owner."

It follows then that where a suit for infringement is brought under the act of March 3, 1881, the complainant can only claim and obtain damages for the interference with his commerce with foreign nations and Indian tribes. As a general rule, the trade with foreign nations and Indian tribes is infinitesimal compared with the interstate trade. Indeed, no owner of a trade-mark would care to institute a suit for infringement if he knew that he could only obtain damages to his trade among the Indians and with foreign countries. Yet that is just what the Supreme Court of the United States has held, which makes it necessary that something should be done as soon as possible to remedy the present conditions. The law, as it stands, is radically and vitally defective, and the only remedy for the owner of a trade-mark is under the common law or by state registration.

It may not be generally known that many of the states of the United States register trade-marks which are used within the states, and in some instances their laws are quite stringent and provide drastic remedies for counterfeiting trade-marks. Outside of the burden placed on the owner of a trade-mark by requiring him to register his mark in various states, there must be considered the fact that quite a number of the states do not provide any means for registering a mark used exclusively within the state. In those states the owner of a trade-mark would have to lose the benefit of his trade within said states, and could only obtain damages for trade outside or between the states. It is plain that Congress should come to the rescue, and enact early in the next session the bill which has been prepared to revise the trade-mark laws and remedy the present evils. Said bill has the sanction of the American Bar Association, and therefore may be considered as embodying the views of the experts of the profession.

Alcohol Reckoner Wanted.

The French Government has offered to inventors a prize for the best compteur, or reckoner, used to measure alcohol on its production. The prize is divided into three sums, to wit: One of 5,000 francs (\$965), one of 3,000 francs (\$579), and one of 2,000 francs (\$386). Competitors must give notice before December 1, 1904. The internal-revenue tax levied upon alcohol in France is calculated upon the volume of pure alcohol contained in a liquid at a temperature of 15 degrees. It is therefore desired to get a compteur that will determine with certainty this degree as the liquid comes from the distilling apparatus.

MORE LIGHT ON THE DIVISION OF APPLICATIONS.

In its last issue, the AGE printed the syllabus of a decision by the Supreme Court of the United States bearing on the subject of requirements by the Patent Office for division of patent applications, and commented on the widespread importance of the decision to inventors and others interested in patents. At that time it was impossible to do more than venture an opinion as to what the practice of the Patent Office would be, in view of the said decision. Since then the Commissioner of Patents has rendered decisions in two cases which clearly define the prevailing practice. In another part of this paper the syllabus of these decisions is given.

In *ex parte* Frasch, the Commissioner of Patents held that a requirement for division of an application is to be regarded as a rejection, and therefore appealable to the Board of Examiners-in-Chief in the first instance.

In *ex parte* Pickles the Commissioner held that where division is required, it must be settled before the Patent Office will examine the merits of each separate claim to determine the question of patentability; and that an examination of two or more independent inventions will not be made in one case. It follows, therefore, that where a requirement for division is made in a patent application, the applicant will be compelled to take an appeal to the Board of Examiners-in-Chief if he wishes the question reviewed. The Commissioner will not, in the future, consider by way of petition an application where the question of division is raised, but will compel the applicant to carry the appeal to the Board of Examiners-in-Chief in the first instance. If that tribunal should decide that the Primary Examiner was right in requiring division in the particular application appealed, then a further appeal may be taken to the Commissioner of Patents in person. From the adverse action of the Commissioner, an appeal may be taken to the Court of Appeals of the District of Columbia. Should the Appeal Board overrule the Examiner in his requirement for division of the application, that will settle the question.

The advantage of this arrangement to the inventor is that having *once* taken an appeal to the Board of Examiners-in-Chief, he can take a second appeal to that tribunal on the merits of his application without further expense. In other words, after the question of division is settled, an applicant would have the right to appeal to the Board of Examiners-in-Chief again, should any dispute arise with the Examiner as to the patentability of any of the claims of his application. As the result of this practice, the Board of Examiners-in-Chief will bear the brunt of the work of the Patent Office, and its importance as an appellate tribunal will be largely increased. There have been times in the history of the Patent Office when it was suggested that the Board of Examiners-in-Chief should be eliminated as an appellate tribunal of the Patent Office. It has not been so long ago when a Commissioner of Patents endeavored to have this done by Congress, his opinion being that there were too many appeals allowed to an applicant.

We believe that the conditions will be improved rather than otherwise by the change in the practice, and that a more stable and certain line of practice will be established in requiring division in applications for a patent. Certainly, there is room for improvement in present conditions. It is sincerely hoped that the prediction will be verified by the course of future events.

SCIENTIFIC

PROGRESS.

Most Powerful Automobile.

In a recent number of *The Car* it is announced that M. Bellamy, of Paris, has an automobile with the most powerful engine ever put on a motor car. The engine is 165 horsepower, with 8 cylinders and 3 forward speeds, the second speed being geared for 80 miles an hour. Last year it was thought phenomenal to put 100-horsepower engines on motor cars. Larger gasoline engines have, of course, been made for other purposes, the Wolesley Company having built a 600-horsepower motor for marine work, this engine having 16 cylinders.

Method of Protecting Metals.

Peter J. Burns, of Elizabeth, N. J., has recently patented an improvement in methods of protecting metals, a one-half interest in which he has assigned to Louis H. Barker, of Jersey City, N. J. It is the object of the present invention to provide a coating for iron structures which is much more permanent than paint alone. A coat of paint is first applied to the iron or steel, and while still moist and sticky, a layer of paper is applied in such manner that the paper conforms to the surface of the iron work. The outer surface of this paper is then coated with ordinary paint of good quality.

The first or inner coat may be composed of material ordinarily used for coating metal, and preferably should be of a slow-drying character. A paper which is non-porous or substantially impervious to air is preferably used, and it has been found in practice that paraffin-paper, for instance, works very satisfactorily. By this method, both coats of paint may be applied practically at the same time, the layer or stratum of paper forming a base or support for the second coat. The paper covering and the outer coat of paint being applied while the inner coat is still moist, prevents the inner coat from drying out and becoming porous. Thus the paint is very much more durable.

Reindeer Wool for Clothes.

However useful the skins of reindeer may be to the inhabitants of the Arctic regions, it is not generally known that the wool is used for clothing by people of our own zone. To the Laplanders, the Greenlanders and the Samojedes of northern Asia, the reindeer is the most valuable possession, the meat serving as food, the hide furnishing leather for tents and clothing, and the female reindeer, nourishing milk. From time immemorial they have known how to manufacture coarse but warm blankets from the woolly hair of the animal. These are an excellent protection against moisture and frost. The Norwegians were the first to observe how well the reindeer swims across large bodies of water, and to infer therefrom that there must be something in the animal's hair that adapted him to such exposure. This

led to the manufacture of fabrics to wear at sea in winter.

In examining the hair of the reindeer, it will be seen that it is not hollow for its entire length, but is divided or partitioned off into numerous cells, like water-tight compartments. These are filled with condensed air, and their walls are so elastic, and at the same time of such strong resistance, that they are not broken up either during the process of manufacture or by swelling when wet. The cells expand in water, and it thus happens that a man clad completely in garments made of reindeer wool does not sink when in water, because he is buoyed up by means of the air contained in the hundreds of thousands of air cells.

In Austria, there is a factory of garments of reindeer wool, making a specialty of bathing costumes. It will be readily seen that the fabric will be of great use for people who are unable to swim, or who are beginning to learn, as well as for more general purposes.

Liquid Air in Medicine.

The employment of liquid air in medicine and surgery is making important progress. It can now be obtained in sufficiently large quantities to be of general utility, and it has been found of great value in the treatment of inflammations, etc. In any case where cold applications are desirable, these can be administered more satisfactorily and pleasantly with liquid air than in any other way known to medicine. An inflamed knee, for instance, can be exposed to the cold vapor emanating from a vessel of liquid air, and any degree of temperature can be given. Other methods are to soak a towel in the liquid air and apply it to the joint, or to fill a glass tube with the liquid and roll it over the surface of the flesh. The liquid air, when applied directly and intermittently to the skin, produces a stimulating effect. Any foreign growth upon the skin can be destroyed by the use of this element. Chronic ulcers can be cured by spraying. Fibroid tumors can be removed quickly and with less pain than by any other known means, and if not done too rapidly, no scars are left. In the treatment of carbuncles, liquid air is asserted by a medical authority to be a specific. A thorough freezing seems to destroy the germ, and only a few treatments are necessary to effect a complete cure. If liquid air could be of service to the medical profession in the treatment of no other form of disease, says the authority above quoted, its success in the treatment of carbuncles would be a sufficient reward for its discovery.

In this connection, it is of interest to note how far liquid air can be successfully transported. The manufacture of liquid air for scientific and technical, as well as medical purposes, has assumed such proportions, that the question of its transportation over certain distances without serious loss of evaporation is an important one. A recent experiment for testing its durability has been reported from Germany. Two quarts of liquid air, packed in a manner to specially adapt it for this purpose, were sent from

Berlin to Geneva. It reached its destination in five days, and after further delay of half a day, it was delivered to a chemical laboratory, where the shipment was opened. The glass vessel in which the air was sent still contained one-fourth of a quart, which was at once experimented with. This is, it is stated, the longest distance over which this curious liquid has been transported, and it is probable that if the shipment had been larger, the loss would have been relatively less.

Type-Printing Telegraph.

A new type printing telegraph which is being put upon the market by the well known German electrical firm of Siemens and Halske, has the special advantage of very rapid work. The public is familiar with the automatic telegraphs, where the message is written on an apparatus similar to a typewriter, every letter to be telegraphed punching a hole in a continuous paper tape. This tape then runs through the rotating telegraph instrument, and corresponding currents pass over the wire. With the best auxiliaries, a single operator cannot attain more than an average speed of 200 or 300 words a minute. By this new apparatus, about 2,000 letters are transmitted over the wire in the same time. This will make it possible to send telegrams from a number of operators over one wire. For every letter, the apparatus punches two holes in the tape, and directly over them the letter is printed in ordinary type, so that the perforated tape contains also a legible telegram. It is even possible to have the perforation done outside, in private offices for instance, and the tape sent to the telegraph bureau as a written telegram is now sent. On the receiving apparatus, the tape is received and issued with the same speed, ready to be pasted upon the telegraph blanks. It also contains the telegram in common type.

The device used, which makes it possible to print such a large number of letters per minute, is the electric spark, and the method is as follows: A disk, in which the separate letters are stenciled, rotates at the rate of 2,000 revolutions per minute between a spark current and a moving tape of photographic paper, specially prepared. Each time a spark passes over, a photograph of the letter which happens to be in front of the spark current is thrown upon the tape. This tape runs through little sponges saturated with photographic developer, and the "fixing" solution. The photographic process is completed in nine seconds, and the tape comes out printed.

The problem to be solved was to make the spark occur with the exactness of a forty-thousandth part of a second, so that the proper letter should appear in the proper place. This precision was attained by taking advantage of the property of electric condensers, of loading and unloading themselves, in very brief intervals. This so simplified the mechanism of the device that the receiver—aside from the photographic device—appears merely as a spindle moved by an electromotor, upon which, in addition to

the type disk, there are fastened a few brushes, which glide over the contact plates.

There are also five relays of special construction, the tongues of which follow the rapid impulses with sufficient speed. An ingenious device so regulates the operation of the machine that the receiving apparatus, within a stated time, make precisely the same number of revolutions as the transmitting apparatus. Not only is the mechanism simple, but it is reliable in working, and it has been found practicable to use the system over considerable distances. Any method of facilitating means of communication will be welcomed by the world of business.

New Fire Extinguisher.

In view of the feeling dominant in the United States since the Iroquois disaster at Chicago, a description of the test of a fire extinguisher at Dresden, Germany, may be interesting.

The exhibition took place at the Sportplatz, in Dresden, and was attended by the director of the Royal Opera House and Theater, the chief of the fire department, the military commander, and by a number of manufacturers and others interested.

The inventor, Max Eberhardt, of Munich, states that the powder used with the water to make the solution costs about 5 cents per pound and can be readily obtained anywhere; but the ingredients are his secret. When prepared, the solution presents a chalky appearance, but the inventor states that it will not stain or otherwise damage woolen or cotton material, which, while wet with it, will not burn.

In the first test the inventor saturated some strips of bagging with petroleum, applied a match, and when the material was blazing dipped his hands into a bucket full of the solution and slowly rolled the material into a ball, putting the fire out with no pain or inconvenience. This was done several times and, finally, by one of the on-lookers, with the same result.

The next test was made in a vat about 5 feet long and 3 feet wide, which was filled with coal tar, over which petroleum was poured. When this was ignited great volumes of smoke and flame went up, and the fire was so hot the bystanders were compelled to retreat. While the fire was most furious, one bucket of the solution was dashed over it and not a vestige of flame or fire remained.

The final test was made with a pile of logs, somewhat resembling railway ties, which were built in layers of two, each to the height of 12 feet, and in the openings loose straw was stuffed, and then two buckets of petroleum were poured over the whole.

A stiff breeze was blowing and when this material was ignited a fierce fire was in progress, which was allowed to burn for five minutes. A hand pump with a hose attached was near by, and when destruction of the pile seemed certain, the inventor sprayed it with the solution, extinguishing the fire in about thirty seconds. On examination, the logs, which were much charred, showed they had been thoroughly ignited.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE. This keeps inventors and manufacturers posted in the art in which they are most interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy; twenty copies \$1.50.—Please give correct data in ordering.—Address,
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Sewing machine cabinet.....W. C. Free
Sewing machine hemmer-guide.....H. Blaskopf
Shade cabinet. Window.....A. E. Kretschmer
Shaft coupling.....C. N. Scott
Shaking screen.....T. L. & T. J. Sturtevant
Sharpener. Knife.....F. H. Smith et al
Shearing and clipping device.....J. K. Priest
Sheet delivery mechanism.....W. Spalckhaver
Sheet folding machine.....C. W. Bennett
Shock squeezing device.....W. I. Brown
Shoe fastener.....G. D. Brent
Shoe former.....F. A. Heath
Shoe holder.....C. B. Koster
Shoe nailing machine.....W. Heaton
Shoe case.....S. E. Parrish
Show case construction.....O. Durr
Shuttle. Hand threading.....D. Brown
Sifting machine or screen.....W. L. Burner
Sign. Changeable.....G. E. Burnham
Skeining or winding cylinder.....J. H. Young
Sled. Motor.....T. Halldorsen
Smoke consuming apparatus.....G. A. Doebeel
Smoke consuming furnace.....J. B. Harris
Soap lock.....G. D. Snell
Soap, &c. Machine for stamping.....L. L. Conway
Socket member.....P. H. Stein
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Sodium solid. Manufacturing.....J. P. White
Sound producing instrument diaphragm.....Z. J. Le Fevre
Speed mechanism. Variable.....C. F. Laur et al
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Spinning and doubling apparatus.....R. W. Moncrieff
Spinning and twisting frame doffer.....D. E. Carey
Splicing tool.....A. B. Probasco
Spring head pinning machine.....C. F. Shomaker
Spring retaining clip.....E. E. & C. T. Wilt
Stable beam suspension device.....J. Werner
Stacker. Hay.....J. C. Shafer
Stamp battery guide.....W. S. McDonough
Starch. Manufacture of.....R. Goldschmidt et al
Steam boiler.....D. W. Robb
Steam boiler.....A. Parfitt
Steam engine.....W. H. Stohlmann
Steam engine.....J. M. Clark
Steam generators. Device for removing steam from the heating surfaces of.....S. M. Cockburn
Steam trap.....S. Steumitz
Steel, &c. Converter for making.....W. B. Burrow
Still. Water.....F. H. Smith
Stirrups. Safety.....E. L. Parrish
Stool. Folding.....G. W. Pike et al
Stopper for preventing the refilling of vessels.....P. Bonneteau
Storage apparatus.....J. M. Dodge
Storage battery.....M. C. Burt
Stove.....H. H. Brown
Stove. Heating.....P. J. Coppens
Strainer.....F. G. Brown
Support. Adjustable and collapsible.....E. G. Patten
Suspenders.....H. G. MacWilliam
Suspenders.....W. O. McCurdy
Sweeping machine.....E. L. Keyes
Switch mechanism. Electrical.....H. Krantz
Switch rod. Adjustable.....H. Elliott, Jr
Switches. Automatic circuit breaker for electric time or other.....A. W. Hutchins
Tank float holder.....G. A. Blake
Telephone.....M. C. Burt
Telephone counting system.....J. H. Meyer
Telephone line service meter.....C. E. Scribner et al
Telephone line service meter.....F. R. McBerty
Telephone transmitter.....J. A. Williams
Tenoning and boring implement handles. Machine for.....G. S. Clow
Tent.....W. Y. Hunter
Therapeutic purposes. Electrical apparatus for.....F. C. Fisher
Thermostat.....D. H. Hayward
Thill coupling.....reissue.....H. C. Ingraham
Threshing machine chaffer.....W. E. Bradley
Threshing machine concave.....S. S. Mishler
Till. Cash.....F. W. Baynes
Timepiece holder. Illuminated.....W. J. Shepherd
Tins, pots, &c. Apparatus for cleaning.....W. G. Mortimer
Tire. Cushion.....J. H. Toole
Tire protector. Pneumatic.....L. Niore
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Tobacco pipe.....I. Neuberger
Toilet appliance.....J. E. Smith
Tongs. Clinker.....C. Clear
Tool. Pneumatic.....W. H. Soley
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Towel or other rack.....C. G. Dolber
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Trace holder.....C. A. Bertrand
Track structure.....L. Steinberger
Train signal.....J. D. Landers
Transmission of energy. Apparatus for wireless.....D. M. Moore
Transom side bearing.....M. Dorn
Trestle frame.....G. H. Smyth
Trucks. Pneumatic sander for car.....C. A. Pratte
Tubes. Manufacturing.....L. O. Bentel
Tubing. Implement for truing the ends of.....E. D. Webb
Turbine engine. Rotary.....G. Griesche
Turbine. Steam.....F. D. Shepherd
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Turbines. Detachable blade for steam.....E. E. F. Fagerstrom
Twisting machine. Belt driven.....J. E. Tynan
Type bar bearing.....L. Myers
Type writer indicator.....J. N. D. La Touche
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Umbrella rib connection.....J. O. Larrabee
Valve.....F. F. Tunsberg
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Valve. Compressor.....S. A. Reeve
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Wagon stake or standard.....F. R. A. MacKinnon
Wagons. Device for unloading and distributing earth, manure, &c. from.....W. von Chelmicki
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Wash apparatus.....C. F. V. Fluit
Washing machine.....C. S. Page
Washing machine.....L. W. Smith
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Water closet.....W. Kulow
Water gage.....L. A. Bertram
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Weighing apparatus. Automatic.....W. Northrop
Well drills. Crank movement for.....W. R. Vanderwerker
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Wind engine.....C. F. Blacketter
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Window frame.....T. F. Ware
Window frame. Metal.....H. C. Smith
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Wireless transmission. Peaked wave.....D. M. Moore
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Boiler glass water gage. Steam.....G. S. Neeley
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Bottle closure.....K. H. Cressman
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Brake.....F. Stoltzenburg
Brake adjuster.....F. E. Beatty
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Brick making machine.....J. G. Venables
Bridge.....J. Tomlinson
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Candle molding machine.....S. H. Leavenworth
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Coal or coke briquets. Producing pit.....J. Lieb
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Coin collecting box or receptacle.....J. C. Hansen-Ellehammer
Combination case.....W. E. Chatterton
Compiling statistics. Apparatus for.....C. F. Pidgin
Contact finger tip. Removable.....F. E. Case
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Conveyer system.....D. A. Keating
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Corset.....S. S. Gaylord
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Coupling.....D. Greenbury
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Educational device.....E. W. Barker
Egg tray.....H. R. Drake
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Electric boosters. Controlling.....E. M. Hewlett
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Electric lock.....F. Lombardi
Electric machine shunt controller.....N. O. Nelson
Electric machines. Means for starting alternating current dynamo.....J. E. Woodbridge
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Electric resistance.....H. von Kramer
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Electrical disturbance detector.....J. C. Bose
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Fire escape.....E. W. Appelmann
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Rail joint coupling.....J. W. Hafer
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Railway road bed construction.....W. H. Swigart
Railway safety block switch.....C. E. Davis
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Roofing.....J. H. Munro
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Rotary engine.....F. A. Frauen
Routing machine clamp.....V. Royle
Rule. Protractor.....L. B. Rhodes
Saddle.....F. Mesinger
Sash bar. Ventilating.....F. Lyster
Saw set.....O. E. Stickler
Sawing machine.....T. C. McCormick
Scaffold. Portable.....C. G. Maxey
Scale. Pocket.....A. F. & W. Meisselbach, Jr
Scarf pin.....2 pats.....G. W. Dover
Scoop and weighing apparatus. Combined.....J. L. Taylor
Screw for metal, wood, &c., and means for operating same.....G. C. Smith
Seeder and planter.....W. L. Casaday
Sewer trap.....F. Osterie
Sewing machine magnifying attachment.....S. Jones
Sewing machine spool holder.....A. Gorton
Shade adjuster. Window.....R. Atou
Shaper. Vertical.....L. H. Colbaru
Sheet metal band for pipe coverings, &c.....E. H. Larkin
Shell grader and separator.....G. W. Schreurs
Shell head feeding apparatus.....F. W. Olin
Shoe polisher.....J. H. Wilson
Signaling device. Electric.....T. C. Laney et al
Siphon.....H. P. Roberts
Sister hook.....T. H. Brady
Skirt gage.....M. M. McGowan
Skirt holder.....F. G. & R. O. Spear
Skirt or garment supporter.....W. G. Johnson
Skirt supporter.....T. N. Schebler
Sleigh attachment. Bob.....A. Rockstad
Sleigh. Steam.....J. R. Tibbits
Soap and making same.....G. A. Schmidt
Soap, &c. Apparatus for making chip.....W. M. Morse
Soap receptacle.....W. E. Robinson
Speed differentiating device.....F. H. Cheyne
Spinning apparatus. Yarn.....J. Hayden
Spraying device.....R. B. Williamson
Spring.....O. D. White
Spring motor.....F. A. Richter
Stack climber.....C. Stoofire
Stacker. Pneumatic.....A. P. & W. M. Roberts
Stage and circus ring. Combined.....J. J. Jacobs
Stamp mill mortar box.....D. B. Morison
Stamping apparatus for crushing ores, &c.....D. B. Morison
Staple making machine.....H. L. & W. Edge
Station indicator.....O. H. Bissell
Steam generator.....2 pats.....M. H. Plunkett
Steam generator.....S. Straker
Steam. System of economical production of superheated.....A. Leclere
Steel plates. Locally softening or annealing hardened.....C. P. E. Schneider
Stocking supporter.....T. P. Taylor
Stoker. Mechanical.....E. & H. R. Bretney
Stone sawing machine.....G. D. Hunter
Stool.....F. Schellenbach
Storing, displaying, and measuring goods. Means for.....R. C. Miller
Stove for heating irons, &c.....A. V. Maniachi
Stove. Oil.....E. E. Flora
Stovepipe holder.....C. W. Elderkin
Straining attachment Milk can J. H. Blaney
Street indicating mechanism for vehicles.....E. L. Nichols
Striking bag support.....G. McFadden
String cutter.....G. R. Hannan et al
Surgical instrument for hemorrhoids.....J. W. O'Neill
Swaging apparatus.....J. S. Reed
Switch.....E. M. Hewlett
Tablet. Writing.....D. F. Curtin
Tableware. Inlaying blanks for flat metal.....W. A. Warner
Tacker. Hand.....S. Beaugard
Talking machine motors. Multispeed device for.....W. N. Dennison
Talking machines. Combined regulator and brake for.....W. N. Dennison
Tank.....J. W. Wallace
Telegraphy. Multiplex.....2 pats.....S. D. Field
Telephone cabinet.....W. B. Altick
Telephone call attachment.....J. J. Nye
Telephone selective system.....N. S. McKinsey et al
Telephone system.....R. Hamilton
Temperature and moisture regulating apparatus.....W. A. Milne
Tempering and coloring apparatus.....E. Chambers
Tennis. Table.....J. H. Ricau
Thill support.....E. L. Buckingham
Threshing and separating machine.....J. E. Sanders
Ticket system. Transportation.....P. C. Dockstader
Tilting bin.....B. F. Barnes
Time recorder. Workman's.....J. J. Stockall, Jr
Tire armor. Vehicle.....M. Miller
Tire. Vehicle.....W. H. Sewell
Tire. Vehicle wheel.....W. H. Sewell
Tires. Machine for equipping vehicle wheels with rubber.....G. E. Linn
Tool attachment.....A. Jarvis et al
Toy.....J. D. Worcester
Train control system.....G. P. Whittlesey
Transformer.....W. A. Hall
Transformer.....L. M. Schmidt
Transmission mechanism.....G. & H. P. Dillig
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Truck. Car.....F. G. Koehler
Truck. Hand.....E. J. Bryan
Truss pad fastening device.....J. E. Lee
Tube coating machine.....J. W. Howell

Tunnels, shafts, or other excavations. Constructing.....C. Soosmith
Turbine bucket wheel. Steam.....B. H. Hamilton et al
Turbine. Elastic fluid.....W. L. Emmet
Turnbuckles. Making.....W. E. Renner
Type writer line spacing mechanism.....J. Alexander
Type writer's chair, piano stool, &c.....H. W. Boles
Type writers or analogous machines. Tabulating attachment for.....G. L. Palmer
Type writing machine tabulating mechanism.....M. H. Blakeslee
Uterine supporter.....J. T. Hall
Valve.....W. A. Miller
Valve and valve seat.....S. R. Painter
Valve mechanism. Explosive engine.....A. Evensen
Valve. Motorman's or engineer's.....F. B. Corey
Valve operating mechanism.....T. Barrow
Valve. Relief.....S. O. Brune
Vapor generator.....J. Andrews
Vault. Burial.....E. T. Allen
Vault. Grave.....J. W. Freeman
Vehicle body hanger.....H. C. Swan
Vehicle brake.....W. H. Cooley
Vehicle. Motor.....H. S. Baldwin
Vehicle seat spring.....C. L. Thomas
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Voting machine.....A. F. Bardwell
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Washbench.....W. Copeland
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Washing machine.....H. E. Carstens
Watch protector.....M. Sonnenfeld
Watch. Stem winding.....W. M. Matheson
Water closet.....W. H. Osborn
Water cooler. Hot.....J. S. Scott
Water heater. Electric.....J. F. Hathaway
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Water tube boiler.....J. Miyabara
Watering pot.....J. Tracey
Wave motor.....D. G. Weems
Weeding machine.....W. D. Lloyd
Welding compound.....R. S. Woodson
Whiffletree hook.....C. E. Jones
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Winding machine stop motion.....T. Cooper
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Window.....H. E. Essig
Window screen.....M. G. Van Auker et al
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Wire drawing apparatus.....W. D. De Lamarier et al
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Wire rope clamp.....L. J. Couch
Wire twister and splicer.....L. W. Simpson
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Wood and preparing same. Preserved.....I. P. Lihme
Work bench clamp.....J. Peno
Woven fabric.....W. M. Stevenson
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Wrench attachment.....T. O'Shaughnessy
Yardstick. Computing.....W. S. Cogburn

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Lamp. Gas.....A. H. Humphrey
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Adding machine.....C. H. Platt
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Advertising novelty.....W. H. Bender
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Air cooler and filter.....J. Jester
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Animal cleaning machine.....W. Woertli
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Annunciator. Electrical.....A. Carliss
Apartment house.....W. C. James
Automatic gate.....T. I. Duffy
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Ball forming machine.....A. C. Campbell
Balloting machine.....W. M. Dougherty
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Bed bottom.....T. Vients
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Belt conveyor.....J. M. Dodge
Belt joint.....J. W. Elstun
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Bottle closure.....B. Clemens
Bottle closure.....E. E. Adams
Bottle filling machine.....F. C. H. Strasburger
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Bottle. Non refillable.....J. Bailey
Bottle. Non refillable.....H. Breunig
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Bottle. Non refillable.....C. B. Hibbard
Bottle. Non refillable.....W. C. Beal
Bottle stopper.....W. D. Doremus
Bottle washing machine.....F. C. H. Strasburger
Bowling alley dresser.....E. F. Dreger
Bracket.....C. F. Kade
Bread slicer.....G. Root
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Brick stamping machine.....F. W. Miles
Bridge rail connection. Draw.....F. T. Kelly
Briquets. Producing.....J. M. Davidson
Bronzing machine.....M. Fritsche
Broom holder.....W. T. Spillane
Brush.....W. A. Evans
Brush.....E. A. Laitner
Brush for screen doors. Automatic fly.....C. E. Shoemaker
Buckle.....E. A. Maingault
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Buildings out of plastic material. Device for erecting.....W. Harrison
Buttonhole cutting tool.....C. L. Rogers
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Cable tension reel.....J. A. Moser
Callipers. Micrometer.....H. O. Borduas
Call or alarm device for hotels, &c.....H. Reed
Camera.....W. F. Holmer
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Cans. Vent apparatus for oil or other W. Joyce
Canning apparatus. Food.....C. C. Hovey
Candy cutting and shaping machine.....W. W. Turnbull
Car coupling.....A. L. McGregor
Car coupling.....W. H. Johnson et al
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Car frame. Railway.....G. Gibbs
Car. Passenger.....F. H. Rapley
Car stake.....J. E. Puckett
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Carbureter. Hydrocarbon motor.....E. Lenglez
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Carton. Sector-shaped.....J. C. Graham
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Casting machine. Rod.....C. F. Brooker
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Chain link.....W. J. Ball et al
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Cheese cutter.....L. Huijbregtse
Chuck. Rock drilling machine.....W. E. Kimber
Cigar butt former.....C. Wessels
Cigar package. Commercial.....C. P. Kratoville
Circuit breaker.....2 pats.....L. L. Elden
Circuit controller.....J. L. Schureman, Jr
Clasp.....M. L. Seaderling
Clip band fastener.....C. L. Pope
Clock winding indicator.....H. Will
Clock winding mechanism.....W. E. Porter
Closet seat.....L. G. Dobbs
Cloth cutter.....S. R. Jacobs
Cloth strip folder.....A. L. Adams
Clutch.....C. R. Moon
Clutch for carriers. Automatic.....D. M. Motherwell
Cock. Stop.....S. Resek
Cock. Tank ball.....F. C. Smith
Coin holder.....D. J. Cable
Collar.....F. P. Sharp
Comb.....C. H. Howe
Composite drill.....W. R. Down
Composition of matter and producing same.....H. Wolf
Compound engine.....C. J. Mellin
Convertible chair.....L. N. Shoemaker
Conveyer. Bucket.....A. L. Le Grand
Conveyer terminal. Parcel.....L. Abraham
Copying machine. Letter 2 pats.....W. E. Peck
Corn husking machine.....A. F. Klampe
Cotton distributor. Seed.....M. C. Brown
Cotton picker.....J. T. McDonald
Cradle.....F. M. Goddard
Crate. Shipping.....G. Miller et al
Cream separator.....W. T. Oglesby
Cream separator. Centrifugal.....J. J. Berrigan
Cultivator attachment.....E. N. Camp
Current motor.....F. H. Crago
Current regulator.....E. Dysterud
Curtain fixture.....G. B. Hatter
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Dental handpiece.....L. H. Crawford
Display rack.....W. J. McNab
Display rack for ribbons, &c.....J. M. Bostwick
Display stand.....W. G. Winans
Door handle shield.....T. von Wobeser
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Doors, &c. Sliding hanger for.....J. C. Zumwalt et al
Draft equalizer.....L. A. Reep
Draper.....J. C. White
Dress or corset spring.....E. M. Dhale
Drill.....A. Mill
Drill attachment. Disk.....O. A. Poirier
Drill bearing. Disk.....3 pats.....O. A. Poirier
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Driving wheel. Automatically governed.....V. G. Apple
Drum snare tightening device C. A. Stromberg
Dye and making same. Black.....R. Bohn
Easel support.....E. J. Trum
Election booth.....G. W. Naylor, Sr., et al
Electric conductors. Mechanism for removing ice from.....B. J. Jewett
Electric controller for alternating currents.....R. P. Rukenbrod
Electric cut out. Automatic.....G. M. Willburn
Electric elevator.....H. R. Wellman
Electric heater.....R. Kuhn
Electric switch.....P. Sorensen
Electrical induction machine.....K. Lippelt
Elevator.....G. Thalen
Elevator door.....H. Bitner
Elevator safety appliance.....S. H. McCarroll
Elevator signaling device. Electric.....F. S. Payne
Elevator well door.....J. Rashkin

- Elevators, Overflow vent device for..... C. Bradford
Emergency brake..... G. E. Carnes
Envelop clasp..... A. de Saint Chamas
Evaporator, Sap..... S. Wiering
Exercising device..... W. R. Dunbar
Explosive engine, Reversible..... J. A. McGee
Eyeglasses..... L. F. Adt
Eyeglasses..... W. L. Bemis
Eyeglasses..... F. N. Gartland
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Fastener..... C. G. Harger, Jr
Faucet..... M. Farrell
Feed water heater..... E. H. Schwartz
Feed water regulator..... R. G. Brooke
Feeding apparatus, Material W. M. Wheildon
Feeding device and fixtures, Automatic..... Z. Xevers
Feeding mechanism for granular material..... G. H. Tench
Fence barb..... J. H. Akin
Fencing, Wire..... J. W. Sommer
Fifth wheel..... H. N. & J. E. Weaver
Filter..... W. Kathol
Fire alarm..... F. McFadden
Fire escape..... E. T. Marsh
Fire escape..... C. L. Graves
Fire escape..... J. B. Irving
Fish, Preserving..... F. Hamell
Fishing purposes, Illuminating buoy for..... W. L. Uhlenhart
Fishing reel..... L. M. Hermance
Fishing reel..... H. H. Kiffe
Flash light apparatus..... C. H. Nichols
Flashing..... J. H. Munro
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Fountains without water, Apparatus for producing artificial..... C. H. Roedel
Fuel, Artificial..... M. & C. Moscovitz
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Garment fastener..... C. K. Bannibr
Garment hanger..... J. D. Coney et al
Garment supporter..... W. S. Hunkins
Garment supporter..... M. H. Boyce
Garment supporter for men..... W. A. Wright
Gas, Apparatus for producing motive power from liquid..... G. B. Fraley
Gas burner..... T. E. Charlton
Gas engine..... H. C. Bergemann
Gas generator, Acetylene..... M. J. Erk
Gas meter..... R. J. Hoffman
Gas retort, C. H. Montgomery & Agramonte
Gas retort charger and discharger..... W. W. Fiddes
Gas retort feeding apparatus..... A. Feiffer
Gate..... C. T. Harris
Gear, Transmission..... L. A. Frayer
Gearing..... W. Thornton
Glass furnace..... S. O. Richardson, Jr
Glass reheating furnace..... J. I. C. V., F. J., P. R., & F. L. Arbogast
Glassware, Manufacturing S. O. Richardson Jr
Glassware, Manufacturing..... J. I. C. V., F. J., F. L., & P. R. Arbogast
Gold and silver from cyanid solutions, Recovery of..... S. B. Christy
Governor, Speed..... J. G. Helfers
Governor, Hydropneumatic engine..... E. A. Hornbostel, Jr
Grader, Road..... H. L. Braly
Grain drill..... E. C. Bain
Grain dump, Portable, 2 pats..... J. E. Camp
Grain, ore, &c. Transfer spout for P. O. Olson
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Heater..... J. Silverberg
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Oidnauce recoil carriage..... O. Behnke
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Railway rails from spreading, Device for preventing..... I. D. Legge
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Railway tie and rail fastening, Combined..... J. Leigham
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Railway track securer..... J. D. McGill
Railways, Automatic power cut out for electric..... H. F. Pieper
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Rein holder..... C. E. Chamberlin
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Rugs, Manufacturing weft for..... A. S. Horlacher
Running gear, Pivotal..... W. P. Henry
Safe, Sectional or knockdown kitchen..... V. T. Grabs
Salt box, Animal..... A. F. W. Schroder
Sash bolt..... A. Arens et al
Sash fastener..... A. Arens
Sash lock..... C. W. Randall
Sash, Window..... R. Adams
Saw gage, Raker..... W. Stephens
Saw set..... J. B. Lester
Sawing machine..... E. H. Hoff
Scale, Computing..... W. Gerhardt
Scale, Ingredient..... R. W. Romig
Scale, Spring balance..... O. O. Ozias
Seal, Bottle..... E. P. Schmitt
Sealing device..... 2 pats..... W. E. Heath
Separating impurities from granular or like substances, Machinery for..... J. H. Roberti
Sewing bench, Book..... H. S. MacGregor
Sewing machine attachment, Buttonhole..... L. Ecker
Sewing machine, Filled bag..... J. Bigelow
Sewing machine muffer..... C. F. Goforth
Sewing machine tension and thread controlling mechanism..... W. M. Ammerman
Shade attachment, Window G. F. Dickinson, Jr
Shade roller..... B. F. Jackson
Shirt waist..... J. A. Kennedy
Shoe shield..... C. O. Austin
Shuttle, Self threading..... J. B. Daudelin
Side comb..... O. Vallender
Sifter, Gyating..... J. M. Schutz
Sight feed lubricator, Pressure D. H. Roberts
Signaling system..... H. Shoemaker
Signaling system, Wireless..... 2 pats..... H. Shoemaker
Siphon..... C. Miller
Skirts, Woven interlining for..... G. S. Cox
Sling..... F. L. Webster
Smoke consuming furnace..... P. J. Kraetsch
Smoke stack..... P. Dickinson
Smoke stack for locomotive engine houses..... H. A. Walden
Snap fastener..... A. E. Plowman
Soap book..... R. C. Eldridge
Spindle driving mechanism..... E. E. Bradley
Spinner..... H. F. Stimps
Spool rack..... A. S. Horlacher
Spring dowel forming machine..... J. H. Ross
Spring knotting machine..... J. H. Ross
Spring switch..... H. C. Stiff
Square, Hip roof framing..... W. J. Davis
Stair mat..... C. Knopf
Stall, Horse..... J. F. Schmidt
Stamp and punch, Combined ticket..... A. S. Martin
Stamp mill..... M. P. Boss
Station indicator..... H. G. Miller
Stave column..... J. S. Miller
Steam engine..... F. Lane et al
Steam generator..... H. E. Penney
Steam separator..... F. A. Simonds
Stereoscope..... C. L. Pappenbagen
Stiffener bath..... P. Belle
Stirrup..... G. E. McVey
Stone, Artificial..... V. Steger
Stop motion device..... S. W. Wardwell
Storage and display receptacle..... C. A. Brewer
Stove, Camp..... L. J. Clergy et al
Stove, Cook..... J. J. Koch et al
Stove, Heating..... J. Cockrell
Stove lid and cooking utensil lifter, Combination..... G. W. Stengel
Stovepipe fastener..... C. T. McClarin
Stretcher..... P. P. W., & J. W. Sommer
Support, Adjustable..... A. Fleming
Suppository molding machine..... F. R. Bent
Surgical knife..... S. A. Connell, Sr
Surgical or obstetrical sheet W. W. Townsend
Surveyor's pin..... G. I. Herrick
Suspenders..... A. Giesen
Switch connection..... F. C. Anderson
Syringe, Vaginal..... W. S. Locke
Table and desk, Combined..... I. M. Wood
Tackle block, Self-locking..... J. O. Walton
Tag or label holder..... J. M. Waid
Tanning drum..... B. Allen, Jr
Tanning wheel..... B. Allen, Jr
Tape holder..... G. I. Herrick
Taper, Sanctuary..... J. H. Boersig
Target..... G. L. Tonnofski
Telegraph receiving system, Wireless..... E. Ducretet
Telephone..... T. Trowbridge
Telephone attachment..... G. Konigstein
Telephone circuits, Selective signaling for polystation..... B. Stryker
Telephone memorandum holder..... O. G. Byers
Telephone sanitary attachment..... H. L. Thompson
Telephone switchboard secrecy system..... E. H. Smythe
Telephone switchboard spring jack..... M. S. Conner
Telephony..... J. Trowbridge
Tellurian..... T. P. Epes
Thill coupling..... J. A. Steele
Threshing machine..... W. G. Stewart
Tile for wall finish..... W. K. Gore
Tire covers, Lever for manipulating pneumatic..... E. Michelin
Tire, Safety..... A. F. Snelwood
Toole handle..... D. Tappan
Tooth crown, Artificial..... W. N. Kidder
Torch, Vapor..... C. F. Warner
Toy block..... H. B. Haefele
Traction wheel..... J. P. McEwing
Transfer table power device..... L. Bates
Transmitter fronts, &c. Machine for marking..... W. Kailing
Traveling carrier..... D. M. Motherwell
Trolley..... C. M. Wilson
Trolley pole..... E. A. Wakefield et al
Tube making machine..... H. Inman
Tubular or hollow body..... J. A. Hurdle
Turbine, Compound steam..... C. V. Kerr
Twisting head for thread dressing machines..... G. A. Fredenburgh
Type writer carriage feeding mechanism..... J. Alexander
Umbrella geat..... C. B. Baldwin
Valve..... M. J. Chaplin
Valve, Air pipe coupling pressure relief..... D. W. Elliott et al
Valve, Automatic flushing..... F. A. Schosow
Valve, Back pressure..... H. J. Wessinger
Valve, Blow off..... C. B. Bosworth
Valve, Induction..... P. B. Bosworth
Valve, Shut off..... L. Gschwind
Valve, Steam..... J. L. McJunkin
Valve, Train pipe steam..... 2 pats E. E. Gold
Vapor absorber..... J. Patten
Vapor burner..... F. F. Dow
Vehicle wheel..... L. Lange
Vending machine..... J. G. Hendrickson
Ventilator..... L. M. Wood
Vest and drawers holder..... A. Lustig
Wagon, Dumping..... A. F. Otto
Wagon, Eight wheeled..... W. E. Jones
Waistband..... 2 pats..... H. Beerwald
Warping machine clock mechanism..... A. E. Rhoades
Washboard attachment..... N. Lyke
Washine machine..... R. C. Beekman
Washing machine..... W. C. Fawkes
Washing machine..... W. C. Lott
Washing machine..... S. M. Farwell
Washbowl or spittoon..... L. F. Lerchner
Watch regulator..... W. W. Conover
Watch, Stem winding and setting..... A. Blanc
Water meter..... J. Thomson
Wave responsive device..... F. W. Midgley
Weighing apparatus..... F. W. Moldenhauer
Weighing device..... W. Bugler
Weighing machine, Automatic..... E. T. Pollard
Well brake..... S. J. Wallace
Welt cleaner and blacking spreader..... S. J. Ziegler
Wheel..... R. C. Sayer
Wheel..... J. Carpenter
Wheel guard or fender..... 2 pats D. McCausland
Wheelbarrow..... T. J. Montgomery
Wind motor..... D. Phronimos
Windmill..... J. D. Johnson
Windmill..... A. Fornander
Windmill pitman and means for its automatic lubrication..... W. P. Brett
Window cleaner..... J. C. G. Fritz
Wire joint..... J. F. Leslie
Wire rope cutter..... M. T. Wolf
Wire stretcher..... J. W. Montgomery
Work holding device..... C. F. Skoog
Wrench..... A. H. Rankin et al
Wrench..... A. B. Green
Wrench..... T. H. Barry
Wrench..... E. C. Miller
DESIGNS.
Chair..... D. W. Kendall
Clock case..... L. V. Aronson
Gas light globe..... W. S. McLewee
Glass dish, Cut..... T. Singleton
Glass globe..... M. W. Gleason
Glass shade..... M. W. Gleason
Glass vessel, Cut..... W. C. Anderson
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Acid, 1-5-nitroanthraquinone sulfonic..... R. E. Schmidt
Acid, 1-8-nitroanthraquinone sulfonic..... R. E. Schmidt
Adhesive supplying mechanism..... A. Sheddock
Adhesives, Making..... A. Nettl
Adjustable key..... C. J. Caley
Advertising waste paper box..... S. Leveen
Aerial vehicle..... A. G. Bell
Air brake..... J. H. Bleoo
Air heating system..... C. A. Vaughn
Alkoxy caffein and making same..... F. Ach
Amusement apparatus..... G. H. Du Clos
Animal trap..... C. G. Hawkins
Animal trap..... M. C. Harlan
Artichoke trimmer..... A. Roumguiere
Assembling, forming, and setting mechanism..... W. P. Devine
Atomizer..... C. L. Turner
Atomizer..... S. Kettle
Axle brasses, Implement for replacing..... A. Case
Bag fastener..... J. D. Wood
Bandage, Suspensory..... W. A. Tainsh
Barber's memorandum and cash drawer..... L. A. Bucklin
Barometer..... C. H. Stoeltzing
Barrel head securer..... S. A. Hunter
Basket making machine..... A. Pohorzeleck
Battery cell..... E. Whitman
Battery grid, Storage..... G. W. Frost
Battery plate grids, Apparatus for making secondary..... A. F. Madden
Bearing, Convertible roller..... J. C. Hoshor
Bed..... G. L. Marple
Bed covering..... E. W. Brown
Bed spring..... J. F. Dixon et al
Belt stretcher..... J. B. Conner
Bending machine..... J. J. Wood
Bicycle handle bar support..... R. H. Tate
Binder, Loose leaf..... J. L. McMillan
Binder, Temporary..... G. A. Shoemaker
Blind clip, Venetian window..... F. Tenney
Blower, Pressure..... A. W. Case
Blue red lake and making same..... G. Gullbransson
Boiler and furnace, Combined..... W. W. Benson
Boiler purifier, Steam..... N. W. & S. Yantis
Bolt heading machine..... H. O. Olson
Bolt holder..... H. A. Parsou
Bolting machine driving mechanism, Sieve..... J. Fraser et al
Bolting mill..... A. Renault et al
Bone holding device..... K. Wiutsch, Jr
Book holder..... R. L. Kinman
Book, Sample card..... E. W. Bredemeier
Booster apparatus..... 2 pats..... L. Lyndon
Bottle..... W. Conard
Bottle..... P. J. Germain

- Bottle closure sprinkler cap. E. A. McIlhenny
 Bottle. Non-refillable. S. E. George et al
 Bottle. Non-refillable. W. A. Coke
 Box fastener. C. W. Beehler
 Brace balance weight. C. F. Keables
 Braiding machine. J. P. Swift
 Brake. M. A. Wodal
 Brake rigging. W. G. Price
 Bread and cake closet. H. W. Diers
 Brick machine. H. A. Stouffer
 Brick or building block. Glass faced. J. H. Leighton
 Brick pallet and truck. F. E. & E. A. Swift
 Broom binding machine. S. P. Fraley
 Brush. G. A. Vickery
 Buggy top attachment. E. Walter
 Building block. R. T. Frost
 Bulkheads. Construction of. J. Truax
 Bung lock. H. Hubert
 Burner igniting attachment. G. Oberlaender
 Bustle. E. Vaughn
 Button forming machine. Collar. E. J. Yale
 Button. Lacing. A. L. Cole
 Cabinet. C. F. Tholin
 Cabinet. Kitchen. E. Guelf
 Can bodies. Forming. F. D. Cleveland
 Can valve attachment. Oil. E. A. Young et al
 Canopy. Adjustable. E. G. Burland
 Capstan. G. Hartweg
 Car coupling. J. S. Henson
 Car coupling. C. A. Tower
 Car. Derrick. M. Schmalz
 Car draft coupling. E. C. Washburn
 Car. Dump. J. C. Dewey
 Car hopper. Dump. J. C. Dewey
 Car. Railway. C. E. Stewart
 Car replacer. H. Q. Hall
 Car seat. Emergency. M. H. Murch, Jr
 Car. Stock. J. L. Rouze
 Car underframe. Railway. J. M. Hansen
 Cars. Flexible metallic pipe coupling for railway. J. Joynt
 Cars. Mounting hoppers for dump. J. C. Dewey
 Carbonator. F. B. West
 Carbureter. Gas engine. G. F. Swain
 Carbureter. Internal combustion engine. G. McCadden
 Carpet fastener. R. Reininger
 Carpet rod and fastener. Stair. C. Michael
 Carriage top seat iron. H. C. Swan
 Cart. Dumping. S. Gantz
 Carving machine. Automatic. F. Streich
 Carving machine. Automatic. F. Streich et al
 Carving machine. Automatic. C. L. Ruehs et al
 Carving machine. Automatic. F. Streich
 Cash register. W. G. Powell
 Cement. Apparatus for the manufacture of slag. C. Gramm
 Cement composition. Magnesite. E. Bidtel
 Cement mold. R. B. Coltrin
 Cement molding apparatus. R. B. Coltrin
 Chain. Belt. E. Magaldi
 Chain links. Machine for cutting out sheet metal blanks for. F. Egge
 Chain. Machine for making sheet metal. F. Egge
 Chair seat spider. J. M. Gernanson
 Check and release mechanism. Automatic. J. D. Wright
 Check hook. C. Heilrath et al
 Checkrein attachment. A. J. Clary
 Cheese cutting apparatus. P. S. McCroskey
 Chemical compounds. Producing. J. J. Griffin
 Cigarette or cigar box. A. G. Psiaki
 Cistern. G. W. Boyer
 Clasp pin. H. W. Fishel
 Clipper. Hair. G. F. Stevens
 Clutch. Friction. C. Seybold
 Coin counting and delivery machine. L. Sumner
 Coke oven door hoist. C. S. Mason
 Coke puller. A. J. Doss
 Coke puller. J. E. Jones
 Comb. N. D. Ingram
 Concentrator. J. Ruedy
 Converter system. Rotary. E. M. Hewlett
 Cooking vessel. H. M. De Sachtet
 Cord knitter. E. M. Kellogg
 Corset. D. Fogliano
 Corset stay. L. I. Cassidy
 Couplings. Lock mechanism for vertical plane. H. C. Buhoop
 Cover. Packing vessel. C. C. Woods
 Crane. L. S. Fleckenstein
 Crane and supporting structure therefor. V. R. Browning
 Crate. Folding. W. Pond
 Crate. Shipping. F. O. Miller
 Creasing machine. C. R. Nelson
 Cultivator. A. L. Samuelson
 Cultivator. S. F. Vance
 Cultivator. G. W. & C. E. Goss
 Cultivator and harrow spring tooth. S. F. Vance
 Cultivator attachment. A. Rodocker
 Curler. Hair. N. B. Stone
 Current ventilator. Double. H. I. M. Ross
 Curtain pole. A. Miller
 Cut off and alarm. Fluid pressure. R. M. Hughes
 Cutting and trimming machine. A. E. Roenigk
 Cutting shears. G. E. Benton
 Cyanamid salts. Manufacture of. G. Erlwein
 Demand meter. R. S. White
 Dental bite taker holder. E. B. Marshall
 Diamonds for industrial purposes. Apparatus for setting. F. Krause
 Display cabinet. E. A. Wilcox
 Ditching and grading machine. R. Russell
 Door fastening device. C. Cadwallader
 Door stop. W. F. Nolan
 Door. Vertically moving. 2 pats. W. A. Cross
 Doubletree. F. L. Wolverson
 Draft equalizer. A. K. Waters
 Draft equalizer. 2 pats. P. V. Schandoney
 Draft equalizer. W. S. Emert
 Draft evenner. C. T. Elliston
 Draft rigging. E. C. Washburn
 Drawing and designing apparatus. H. E. Ablett
 Dredge. A. Boschke
 Dress suit case. J. D. Wood
 Dry battery. A. F. Swan et al
 Drilling machine. G. Smith
 Drum. Heat radiating. E. J. & F. A. Langell
 Drum snare brace. E. Boulanger
 Dyeing machine. Textile fabric. C. L. Rothwell-Jackson et al
 Dynamo brush holder. W. Slee
 Egg drying apparatus. A. D. Robinson
 Electric condenser. M. O. Troy
 Electric current regulator. N. Harrison
 Electric distribution. Panel board for. G. H. Jones
 Electric lock. J. Livingston
 Electric motors. Means for variably operating and controlling. R. Eickemeyer
 Electric wire tip or terminal. S. C. Houghton
 Electrical wire station. W. E. Hamilton
 Electrician's tool. H. H. Hutchings
 Electrogoniometer. A. Grammont
 Elevator. M. Giger
 Elevator operating mechanism. M. J. Daly
 Elevator safety attachment. G. G. Little
 Elevator safety device. C. W. Baldwin
 Engine and compressor. Combined. S. A. Reeve
 Engine and valve mechanism. Cut off operating. P. B. Clarke
 Engine igniter mechanism. Explosive. N. E. Hildreth
 Engine vaporizer. Explosive. J. F. Denison
 Engines. Electric igniter for gas. H. J. Smith
 Engines. Water cooler for internal combustion. C. W. Carrier
 Envelop machine. W. L. Rinehart
 Envelop. Safety. J. F. Irwin
 Explosive engine. J. J. Murray
 Extension brace. F. W. E. Heyssel
 Eyeglass attachment for suspending supplemental eyeglasses. W. Z. Searle
 Faucet attachment. J. J. Tokheim
 Faucet glass protecting attachment. J. B. Tuor
 Feed. Automatic steam boiler. H. W. Fellows
 Feeding hopper. C. R. Moon
 Feeding neutralizing agents to steam boilers. Apparatus for. J. Noey et al
 Fence. S. S. Knight
 Fence post. A. H. & C. R. Cook et al
 Fence reel heads. Machine for making wire. C. Johnson
 Fence tool. Wire. J. A. Miller
 Fence weaving machine. B. F. Bailey
 Fertilizer distributor. J. M. Butler
 Filing cabinet. Sectional. H. J. Huening
 Filter. Barrel. J. D. Hawkins et al
 Filtering material. Apparatus for washing. C. H. Loew
 Fire extinguisher automatic valve. J. H. Derby
 Firearm. Magazine. W. F. Plympton
 Fish culture tank. L. Mayhall
 Fishing apparatus. F. B. Whipple
 Fitting. J. J. Lawler
 Flagpole. H. G. Suhr
 Fluid motor. Rotary. K. P. Haugl
 Fluids in motion. Velocity regulator for. J. B. F. Herreshoff
 Forging machine combination die. H. Jeffrey
 Forking, elevating, and conveying machine. A. P. Tattersou
 Friction brake. L. P. Valiquet
 Fruits and vegetables. Apparatus for scalding and washing. R. I. Fancher
 Fuel atomizer. Liquid. E. G. Duisenberg
 Fuel. Composition. C. H. Carpenter
 Fumigator. A. Van Winkle
 Furnace. S. O. Richardson, Jr
 Furnace bells. Elevating and lowering device for. W. I. Mann
 Furnace feeding mechanism. Billet heating. V. E. Edwards
 Furnace hearth. Smelting. A. R. Partridge
 Furnace valve. Regenerative. J. M. Wight et al
 Furniture folding leg. W. C. Willets
 Furniture joints in position. Device for securing. D. E. Vanvactor
 Fuse for exploding shells. Percussion. K. Wieser
 Gage and marker. W. E. Lough
 Gage table and conveyor. C. W. Herman
 Galvanic battery. C. B. Schoenmehl
 Garbage crematory. H. B. Smith
 Garment hanger. W. H. Olmstead et al
 Gas burner for heating and incandescent gas lighting. V. A. Rettich
 Gas generator. Acetylene. G. Laporte
 Gas igniting and extinguishing apparatus. Automatic. E. H. Stow
 Gas motor engine. A. Rollason
 Gas producer feed device. V. E. Edwards
 Gas separator. O. Gerlach
 Gasoline fuel burner. O. Falkenwaide
 Gear. Power transmission. W. O. Brown
 Gear. Reversing. E. G. Smith
 Gearing. Friction. O. R. P. Berglund et al
 Glass articles. Manufacturing. S. O. Richardson, Jr
 Glass blowing machine. H. Severin
 Glass bulbs. Perforating. W. R. Burrows
 Glove. Reversible. H. S. Simpson
 Gold separator. J. W. Korfhage
 Gong. Electromechanical. F. W. Cole
 Governor. Gas or internal combustion engine. P. Jenness
 Governor. Variable speed. G. W. Casteel
 Grain carrier. J. Coffman
 Grain elevator bagging attachment. C. Bradford
 Grain separator. G. W. Hill
 Grate attachment. Fire. M. A. Stewart
 Grate. Smokeless self-cleaning. F. & A. Girtanner
 Grinder. Harrow disk. F. P. Burkhardt
 Grinder. Sickle. F. P. Burkhardt
 Grinding attachment. M. Brown
 Grinding mill. W. C. Deards et al
 Grooving machine. O. Boehm
 Ground joint. R. Whitaker
 Gun. Pivot. J. Krone
 Guns. Single trigger mechanism for drop down. J. Robertson
 Hair clamp. W. J. Koenig
 Hair drier. F. S. Emmons
 Hair waver. A. Drees
 Hammer. J. A. Thomas
 Handling material. Machine for R. B. Friend
 Harness fastener. E. Cornitiut
 Harvester and binder. E. M. Kellogg
 Harvester. Beet. 2 pats. H. M. Heilig et al
 Harvester. Grain. E. M. Kellogg
 Harvesting machine. Grain. W. N. Whitely
 Hat case. P. M. Beard
 Hat receptacle for auditoriums. J. T. Henderson
 Hay and shocked grain loader. R. Hawkins
 Hay loader. B. F. Kadel et al
 Hay loader. J. H. Thomas
 Hay rack clamp. P. Schmitt
 Hay rake. Horse. 2 pats. L. Brown
 Hay tedder. C. W. Warner
 Hip adjuster. E. B. Neffeler
 Hog ringer. G. A. Robinson
 Hoist. E. Y. Moore
 Hoisting and carrying machine. J. Melcher
 Hoisting equipment. G. W. Bollman
 Hoof and shoe expander. G. Keller
 Hook. M. M. Howland
 Hook and eye. A. G. Miller
 Horseshoes. Making. J. Crowley
 Hot air furnace. W. W. Bryan
 Hot water furnace. S. Tache
 Hydrocarbon burner. W. D. Tucker
 Hydrocarbon burner. T. H. Delaney
 Illuminated indicator. E. Kaye
 Incandescent mantles or illuminating bodies. Manufacture of threads for. A. M. Plaissetty
 Incubator and brooder. E. T. Tolhurst et al
 Ingot mold. C. A. Leibman
 Inhaler. Anesthetic vapor. G. L. Bennett
 Instruction sheet. O. C. De Selms
 Insulating and suspending device. J. Sashic
 Iron into malleable iron or steel. Converting crude. J. J. Deemer
 Jacquard. W. A. Pardoe
 Journal box. I. E. Rogers et al
 Knitting machine needle. C. R. Woodward
 Lace fastener. Shoe. C. A. Conger
 Ladle and mold. S. O. Richardson, Jr
 Lamp. J. P. Nagel
 Lamp chimney. R. L. Valleen
 Lamp. Electric arc. J. J. Wood
 Lamp guard. Electric. J. Kaufman
 Lamp. Miner's. J. A. Hadley et al
 Lamp. Safety oil. A. E. Holdaway
 Lamp terminal. H. I. Wood et al
 Lamps. Portable testing and comparing instrument for electric incandescent. A. McCandlish
 Lantern. Signal. F. W. Dressel
 Lathe dog. C. E. Brown
 Lattice work structure. R. C. Layton
 Lawn rake. O. Kampfe
 Lawn sprinkler. A. Vardervoort
 Leather durable and waterproof. Rendering. F. Stoffer
 Leg. Artificial. L. Duggan
 Lens. U. Neuring
 Lens grinding machine. C. L. Rameau
 Letter sheet and envelop. Combined. E. L. Wilson
 Level. Spirit. R. B. Ferguson
 Lifting jack. Variable power. E. M. Robinson
 Lighting and alarm device. Combined. J. Thorsen
 Lightning arrester. G. Babcock
 Link. Fusible. F. Gray
 Linoleum, &c. cutter. E. Kinney
 Linotype machine. P. T. Dodge
 Loading machine. A. J. Doss
 Lock. J. D. Edmonds
 Lock. W. E. Metzel
 Lock. J. S. Campbell
 Log loading and skidding machine. M. Schmalz
 Loom dobbie leno motion. J. B. Bolton
 Loom for weaving cartridge belt fabrics. W. C. Fisher
 Loom picker mechanism. G. Jolicoeur
 Loom shedding mechanism. O. L. Owen
 Lubricator. W. R. Malcolm
 Magnet coil spool. H. Geisenhauer
 Magnet. Relay. W. Palmer, Jr
 Manholes. Bracket block for conduit. G. M. Gest
 Massage apparatus. Pneumatic. F. H. Crabtree
 Match sticks. Appliance for isolating. F. Czerweny
 Measuring apparatus. F. Blossom et al
 Measuring instruments. Means for protecting electrical. M. C. Rypinski
 Medical compound diluent. J. M. Schütz
 Metal bars into sheets. Reducing. T. V. Allis
 Metal disk wheels. Manufacture of. F. Melann
 Metals. Protecting. P. J. Burns
 Metallic tie and rail fastener. J. F. Lever
 Milk. System for intimately mixing. A. Gaulin
 Mine door. A. H. Lewis
 Mixing machine. W. G. Richardson
 Monobenzoyl arbutin. Making. C. Vilmar
 Motor control system. F. L. Butler
 Mower. Lawn. E. W. Sayre
 Mowing machine harvester attachment. J. Macphail
 Muscle developing finger band. S. H. Seifeld
 Music box carriage feed device. G. A. Brachhausen
 Music leaf turner. F. Guth
 Music leaf turner. G. H. Edgington
 Music sheet. H. P. Ball
 Music stand. R. D. Noble
 Musical instrument. J. E. Berglund
 Musical instrument. R. Scheller
 Musical instrument exercising attachment. H. Wraith
 Musical instrument motors. Winding device for automatic. W. F. Cooper Jr. et al
 Oil burner. R. G. Speer
 Oil burner superheater. J. M. Donahue
 Optical appliance. J. Harraes
 Ore concentrator. G. E. Woodbury
 Ore pulverizer. Impact. J. Thame
 Organ keyboards. Apparatus for warming. Q. M. Waldenschlager
 Overflow alarm. E. M. Weeks
 Overshoe attachment. W. H. Tillsen
 Oxidizing and drying textile material. Apparatus for. J. W. Fries
 Oxidizing organic compounds. M. Moest
 Packing for piston rods. Metallic. F. E. Small
 Packing. Plunger. W. E. McIntire
 Paper box covering machine. J. Bardelli
 Paper holder. Roll. G. W. Webster
 Paper, &c. Machinery for cutting and folding. E. H. Cottrell
 Pedestal. Folding. C. H. Ashley
 Pen. Marking and lettering. C. C. Clement
 Pencil sharpener. 2 pats. F. H. Chase
 Periodical holder. W. G. Lloyd
 Phonograph. T. Lhotz
 Photographic developing apparatus. O. Lienekamp et al
 Photometric apparatus. J. W. Howell
 Pianos players' striking devices. Guard for. F. W. Hedgeland
 Pick and point. L. & M. Kovacs
 Picture hanging device. J. Bryden
 Pin. S. Dancyger
 Pipe coupling. Flexible. J. J. Reilly
 Pipes. Adjustable joint for water and steam. A. L. Holmes
 Piston ring. W. C. Smith
 Piston ring. D. B. Morison
 Plant protector. A. M. Lane
 Planter. Corn. L. P. Graham
 Plaster board. H. E. Sharp
 Plow. J. B. Jarmin
 Plow. Disk. C. Wagner
 Plow point. G. B. Gwynes
 Poke. Animal. T. H. Ewing
 Powder can. E. S. Savage
 Power generating apparatus. R. L. Everett
 Power transmitting device. Frictional. W. O. & J. D. Worth
 Preserve jar and cap therefor. R. A. Gilchrist
 Press and butter mold. Combination. W. N. Harling
 Printing machine sheet delivery mechanism. H. M. Barber
 Printing press tympan feed gage. I. H. Mills
 Pulley. Sheet metal. C. A. Brinley
 Pulverizing machine. S. Hughes
 Pump. J. G. Kirksey
 Pump. Fluid. I. H. Spencer et al
 Pump valve mechanism. H. Unzicker
 Punching machine. G. A. Shoemaker
 Push button. C. J. Klein
 Push rake. O. D. & D. W. Shirk
 Quilling machine. G. Adsit
 Radiator valve. A. L. Bower
 Rail bonding construction. E. G. Thomas
 Rail joint. C. F. Keener
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An Automatic Compass.

A compass for use on shipboard which automatically registers, minute by minute, the direction of the compass, so that by consulting the chart it is possible to see what route was followed at each moment of the passage. The captain of the vessel indicates to the helmsman the route which the ship should follow, but he does not know that it is being followed unless he is continually observing the compass. The new device gives this information, registering every change in the position of the vessel, every move made by the helmsman and the exact time at which the change occurred; and so, in case of many varieties of accident, the chart exactly fixes the responsibility. The apparatus has been in use for several months, and has given complete satisfaction.

The compass card, instead of having at its centre an agate resting on a fixed steel point, is fixed on a steel pivot which rests on a fixed agate. The latter is bathed in a drop of mercury, which serves to conduct the current of electricity which makes possible the registering of the movements of the compass. For this purpose, the card has attached to it a small silver index, which is kept in constant electrical communication with the pivot by a fine and flexible wire. In the usual position, this index does not touch the fixed basin surrounding the card, but by means of the electrical current, the circuit is rapidly closed and opened, with the result that the angle of the boat with the meridian is registered. For this purpose, the basin is divided into a certain number of sections, isolated from each other and corresponding each to a special circuit, the registration being made on a sheet of paper by means of a spark produced by a small induction coil. Certain sections of the basin also correspond to certain call bells, the captain thus being instantly informed of any abnormal deviation in the direction of the boat. The apparatus also gives the speed of the boat, by registering the revolutions of the screws, as a current is closed and a signal sent to the receiver at each stroke of the piston. It further registers the hour of departure and that of every stop or start.

A New Explosive.

Among the new inventions for use in war is an explosive, composed largely of aluminum. It has been known for some time that aluminum can be used to produce intense heat in welding and for like purposes; and in the new explosive—called ammonal—it is combined in a powdered form with carbon and ammonium nitrate. Aluminum, it seems, has a strong affinity for oxygen, and the union of these two elements causes the generation of intense heat. In the explosive, this property is utilized to raise the temperature of the gases which have been produced by the decomposition of ammonium nitrate. To increase the temperature means to increase the explosive power, and it is said that experiments show that ammonal has effected remarkable results.

Transferable Motor.

The latest fad is for motor boats, and although the expense involved in the ownership of a large and rapid vessel makes it the luxury of the rich, those who are content with gasoline or petroleum as a motive power, and who are willing to forego the excitement of racing, will find vessels of reasonable size and speed quite as easily within their means as the automobile. A French firm has invented what it calls a "universal transferable steering propulsor", the great advantage of which is that it can be readily applied to any boat already in existence, thus converting it into a motor launch, without the necessity of boring a hole through the stern post and supplying a permanent propellor shaft and stuffing box. The motor, in

short, can be attached to a boat and removed therefrom without in the least modifying the boat itself. Anyone planning a trip to the seaside need not go the inconvenience of transporting a boat. He need only take his motor with him, and he can attach it to any vessel within its range of power that he finds there. Another advantage is that a rudder is unnecessary, as the boat is steered by varying the angle the axis of the propellor makes with the keel. The propellor can be completely turned around, thus giving a reverse action. It is stated that a number of these transferable propulsors have been adopted by the navies of France, Russia and Japan, and that a 12 horse-power motor has been successfully applied to a launch, which towed a 300 ton canal barge with a load of 150 tons of sand.

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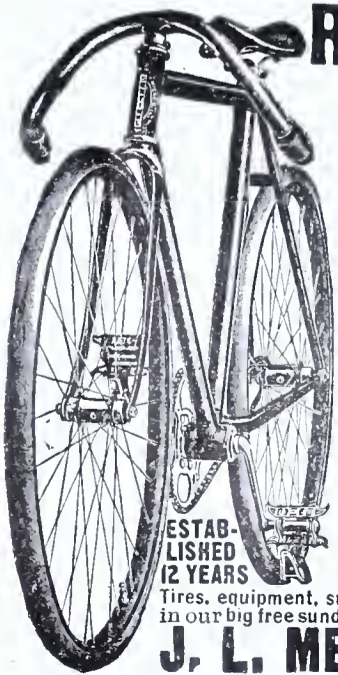
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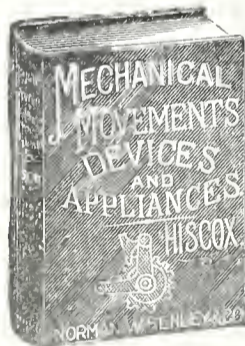
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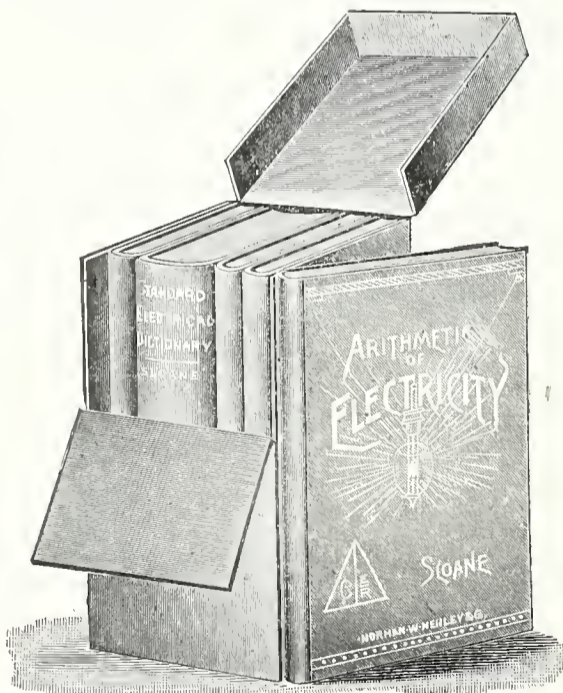
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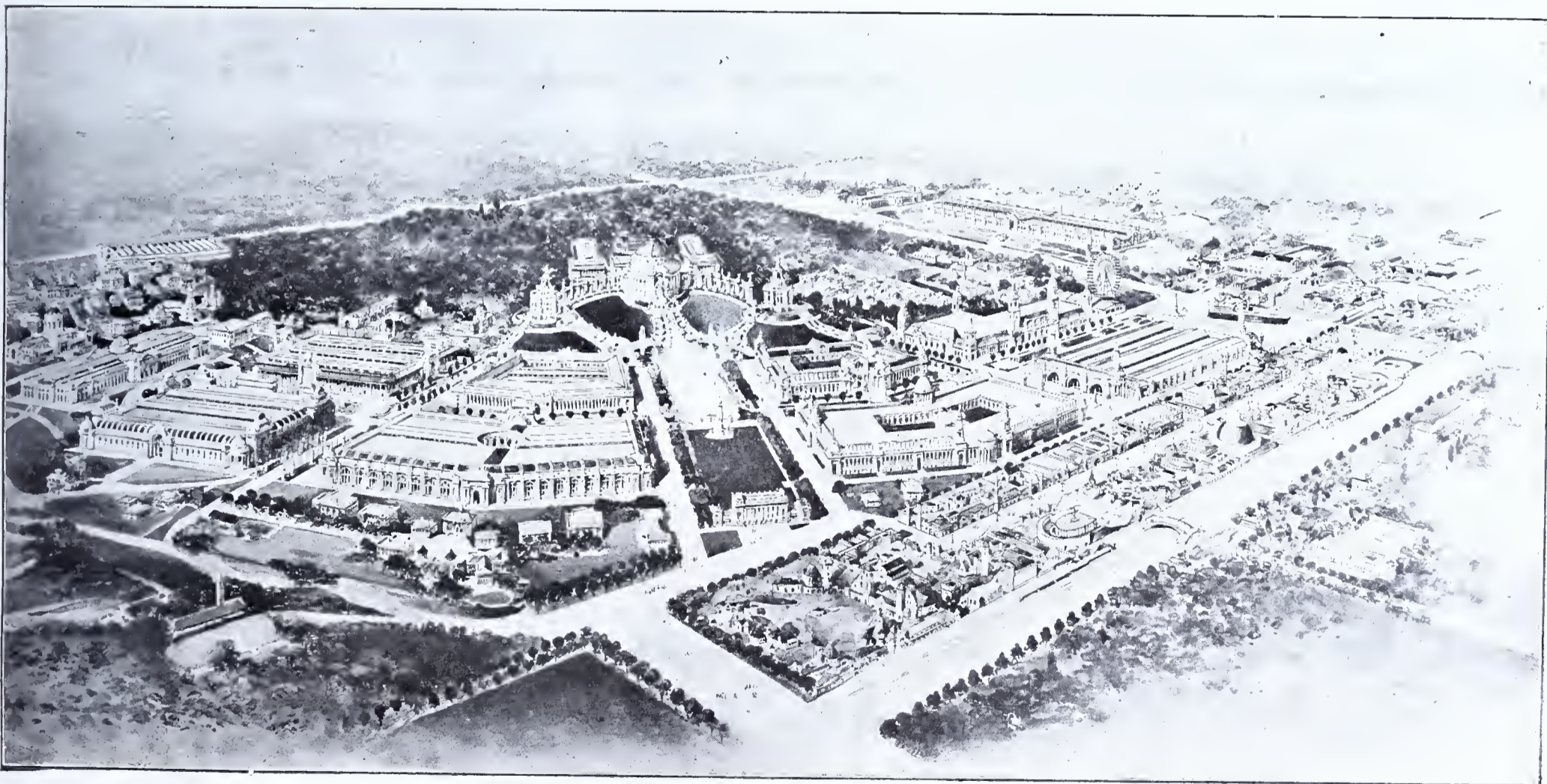
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A Walking Locomotive.

A LOCOMOTIVE that has feet—that walks—is among the anomalies recently introduced to the public. The name leads one to think of the figures in "Alice in Wonderland" or the "Wizard of Oz," rather than a practical apparatus; and yet the device has proved itself to be eminently useful, and to be adapted to purposes beyond the scope of the ordinary traction engine.

The invention first saw the light in Liverpool, where the amount of heavy haulage—from ships and docks to local warehouses and railway stations—is perhaps greater than in any other city in the world, and where public interest is consequently centered in any system that facilitates the methods of transportation. This new device—

there are no roads at all, and where progress by the ordinary traction engine would be absolutely impossible. For instance, it would be suited to hauling minerals from newly developed mines, and lumber from partly cleared forests, and would successfully meet the rough emergencies of military operations.

Professor Hele-Shaw declares his conviction, after a close study of road locomotion for years, that no contrivance can replace the wheel and the pneumatic tire in circumstances where the road service is good and the conditions suitable; but he believes that the wheel itself has reached its utmost limits of carrying power, both in regard to weight and speed upon ordinary roads, however well the roads

gested the invention of walking machines. They have all been failures, and principally so because they have not combined satisfactorily the adapting of the movement of an animal—which is intermittent—with the continuous movement afforded by the properties of the wheel. In the belief of Professor Hele-Shaw, the solution of the problem is the pedrail, which is described by him as follows:

The pedrail indicates by its name that it is a rail carried upon feet, and the principle of its action may be explained in a few words. It is simply this: Instead of having a permanent rail carried for the whole of its length on permanent feet, viz., sleepers, and wheels running upon this rail, the process is inverted. The feet are (as in the case of the railway) placed upon the ground, but instead of the rails being carried upon the feet, these feet support wheels, and the wheels thus supported act as bearers for a short

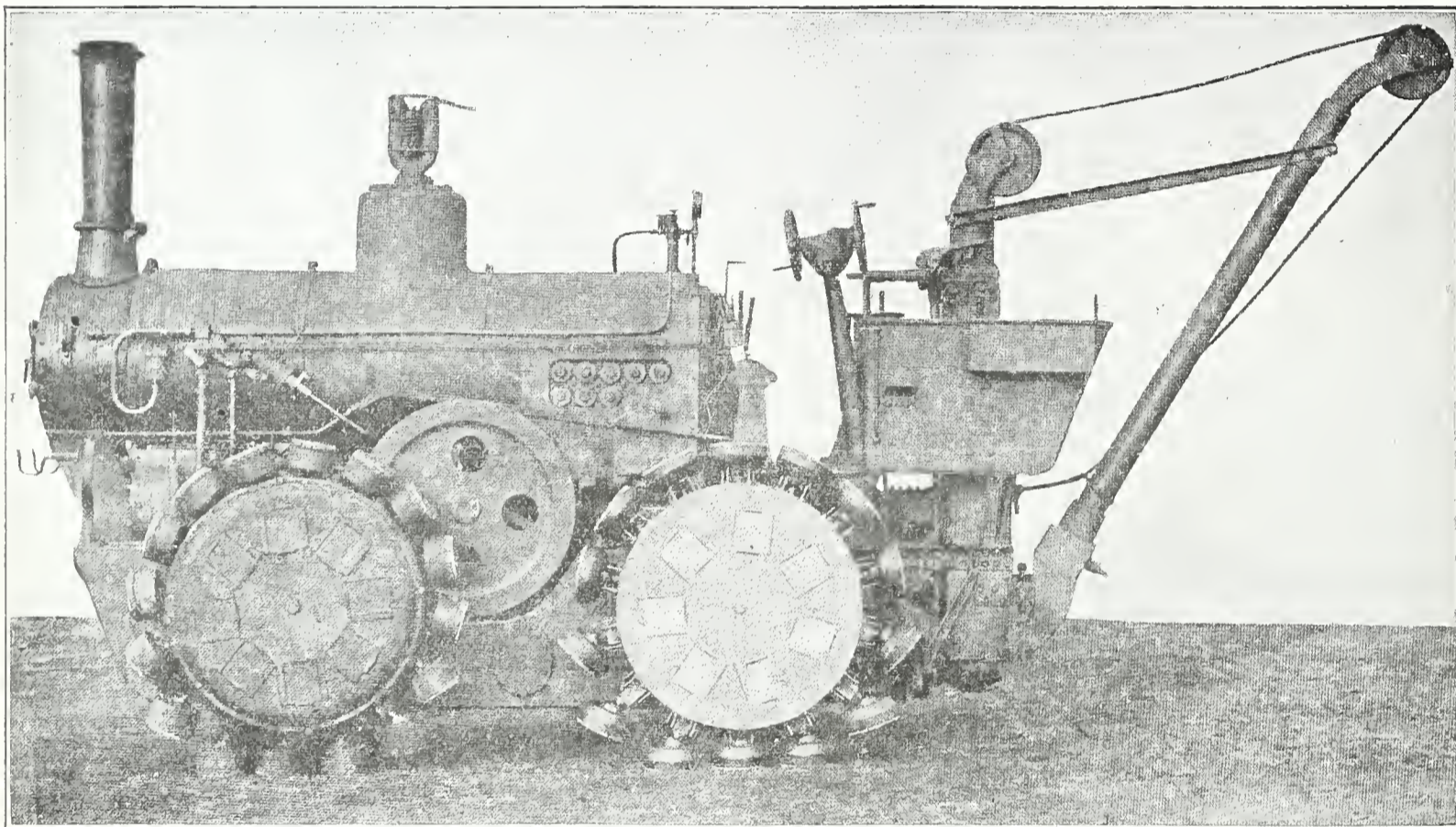
length of rail attached to the moving carriage.

The fundamental idea itself is not a new one. You may see in many timber yards that the logs are moved about by being pushed over supports which carry wheels, and by shifting these supports from place to place the heaviest logs of timber can be rolled upon the wheels to any required part of the yard. The pedrail invention, however, does more than this. The feet and wheels which they support are attached to the moving carriage itself, so that by an automatic process the feet are carried round after the rail is moved over them and placed again in front of the machine, thus affording a continuous track of wheels upon which the supporting rails can be carried in any direction in which the vehicle is steered. * * *

Briefly, the invention might be described as replacing the wheels of an ordinary traction engine by revolving

frames carrying sliding spokes, each spoke having at its end a circular foot, and on the spoke itself, at a little distance above the foot, a small wheel or roller. In connection with each series of revolving spokes a fixed frame is attached to the side of the traction engine. This fixed frame somewhat resembles in form an inverted heart. When the axles revolve the spokes are carried round and in turn place the feet upon the ground. At the same time the wheels, which run round in contact with the heart-shaped frame, when brought underneath it—that is, under what may be described as the portion of the heart—act in turn as supports for the heart-shaped frame to glide over. Hence, the engine is itself supported in turn through the wheels by the spokes which happen at the time to be resting with their feet upon the ground.

The pedrail consists of two main parts, one of which is a railway which is fastened to the axle box and does not revolve, and the other part is a



NO. 2 ENGINE MOUNTED ON FOUR PEDRAILS.

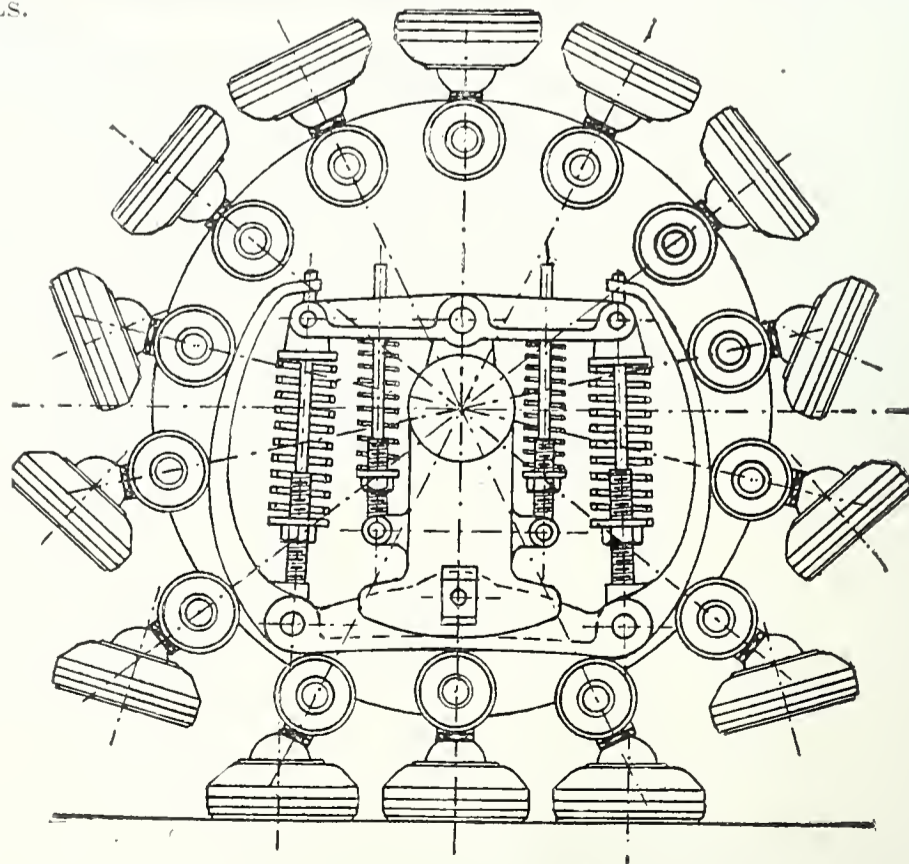
which has been called for short, the "pedrail," has received the endorsement of Professor Hele-Shaw, of the Engineering Department of the Liverpool University, and admittedly one of the greatest living authorities on mechanical locomotion.

The pedrail is variously described as a "walking locomotive," a "half traction engine and half walking machine," a "combination of an endless railway and trotting machine," and a "rail moving on wheels." The British scientific journals speak of it as "a traction engine which actually and literally walks upstairs with the stride and sure-footedness of an elephant, and hauls loads behind it under circumstances which would nonplus an ordinary engine. Ruts, curbstones and boulders are stuble before it." The inventor is a Mr. Diplock, of London, and he claims that his device can be used with advantage not only for ordinary freight haulage on common roads, but is thoroughly practicable as a traction engine over bad roads, and even in districts where

may be constructed or however perfectly the wheel may be made.

The Professor submits this question: Is there in use a means of locomotion on land imitating successfully the marvelous natural process of animal locomotion, but modified to suit the mechanical requirements of the case? The wheel, he says, falls hopelessly short of the mechanical action of an animal's foot. The animal does not turn upon its foot: the turning takes place upon the ankle, which, being flexible and having a ball-and-socket joint perfectly lubricated, affords the very minimum of resistance. The foot is placed upon the ground and kept there, thus insuring the minimum of rubbing action with the surface; whereas the wheel is only adapted to turn on the surface of the ground itself.

Second, while the wheel when it strikes an obstacle meets with bodily resistance, the foot can be brought down upon an obstacle and the body elevated over it gradually with the least possible amount of shock. These considerations have naturally sug-

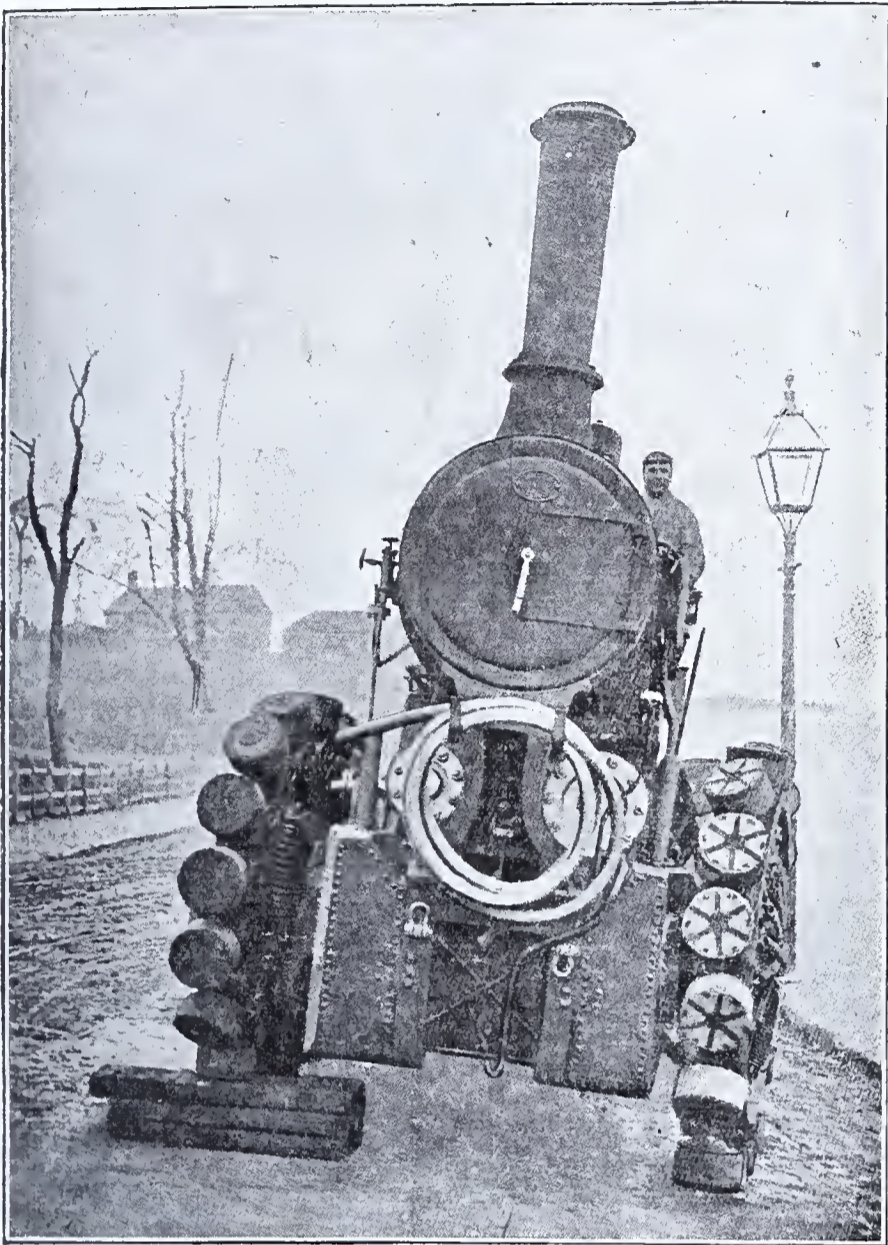


SIDE VIEW OF PEDRAIL, SHOWING RAILWAY.

kind of circular box carrying sliding spokes, rollers, and the feet in such a manner that the rollers and feet are placed in succession on the ground, and the rail runs over them.

It has attached to it a 4-ton crane, so that it can lift and carry heavy

been forbidden in many parts of this country and also in various parts of the world, and heavy motor wagons and traction engines have been severely taxed by local authorities and made to contribute to the repair of the roads, the pedrail positively improves



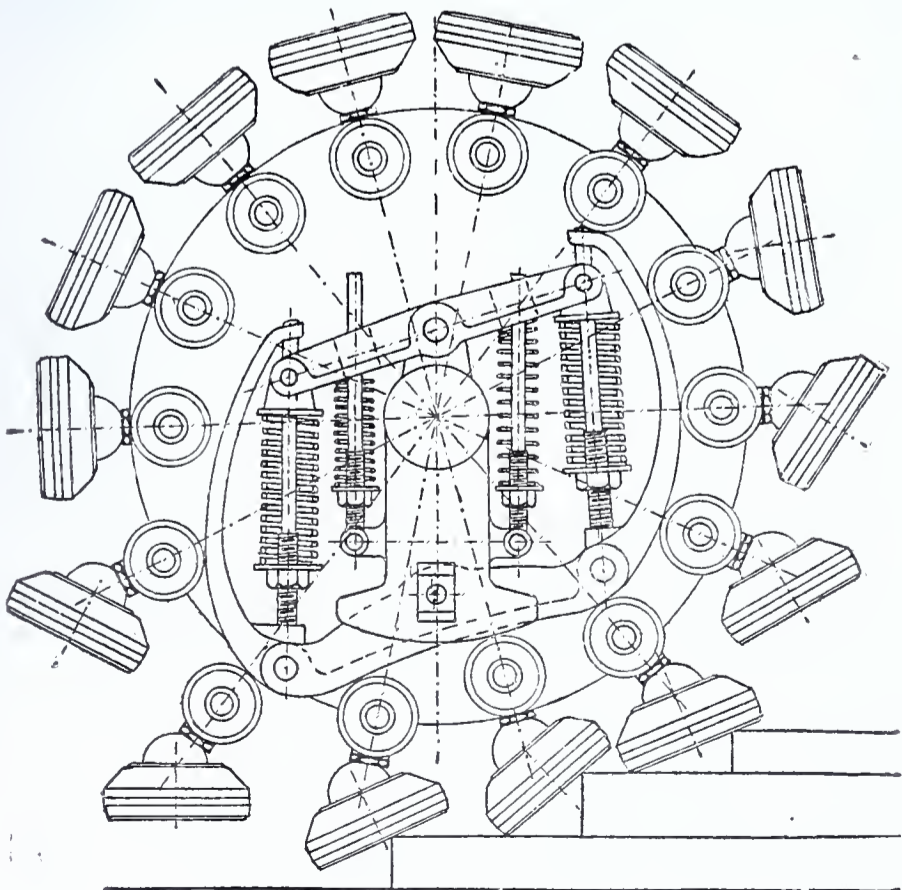
PEDRAIL ENGINE TURNING A CORNER OVER AN OBSTACLE.

goods, minerals, or agricultural produce.

The action of the pedrail on the road is very remarkable. Whereas the ordinary traction engines destroy roads to such an extent that they have

the road over which it walks.

It is claimed that the pedrail can, with certain modifications, be attached to any ordinary traction engine. It is believed that this device will work a revolution in mechanical locomotion.



SIDE VIEW OF PEDRAIL MOUNTING STEPS.

Torpedoes in Warfare.

THE deadly work accomplished by the torpedo boats in the war in the Far East has aroused curiosity, outside of the well-informed naval circles, as to the actual means of working of these implements of destruction. When the armor-clad battleship had attained a commanding position in naval service, the necessity for some form of torpedo was obvious, by which the monster could be attacked below the armored belt, under the water. In every modern war-ship, cruiser and torpedo boat, there are tubes, like so many large gun barrels, built into the vessel, some above, but mostly below, the water. From these tubes, the torpedoes are discharged at the enemy.

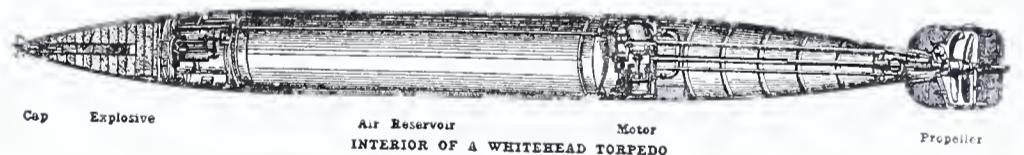
a porpoise, adjusts itself to the desired depth, and makes for its prey. As soon as it leaves the guiding bar, the propellers start to work. A rudder is provided for keeping the projectile on a straight course. A gyroscope operates the steering mechanism, and this device is most ingenious, correcting the least deviation from a direct line, and causing the torpedo to travel through the water as straight as a bullet.

The torpedo can be aimed as accurately as a rifle, and can be adjusted from the conning tower of a ship and discharged simply by pressing an electric key. When it strikes the enemy's ship, it does not, as many



(See Fig. 1.) The modern Whitehead torpedo, generally known as the automobile torpedo because it is self-propelling, is the most effective in this line of battle, and consists of a strong steel cylinder, somewhat in the

people suppose, blow her "sky high." There is a heavy, shuddering shock, a column of water is sent high above the decks, and there is a sickly smell of explosives. That is all that is seen or felt by those on board the doomed



form of a cigar, about 18 inches in diameter and some 18 feet long. It carries in its front end a charge of about 200 pounds of high explosive, provided with a percussion fuse, by which it is exploded when it strikes an object. The main body of the cylinder is filled with compressed air, forced in by powerful air pumps, until a pressure of about 1500 pounds to the square inch is reached. Immediately in the rear of the air chamber is the driving mechanism, (See Fig. 2.) and this is operated by the compressed air which escapes under control, and thus drives the propellers for forcing the projectile through the water. A guiding bar directs the torpedo until it is well clear of the ship. When the tube is above the water, the torpedo dives, on making its exit, like

vessel. But below water, the steel plating of the ship has been torn and twisted like so much paper; there is a gaping hole through which a street car might pass, and the boat will, in most cases, go promptly to the bottom.

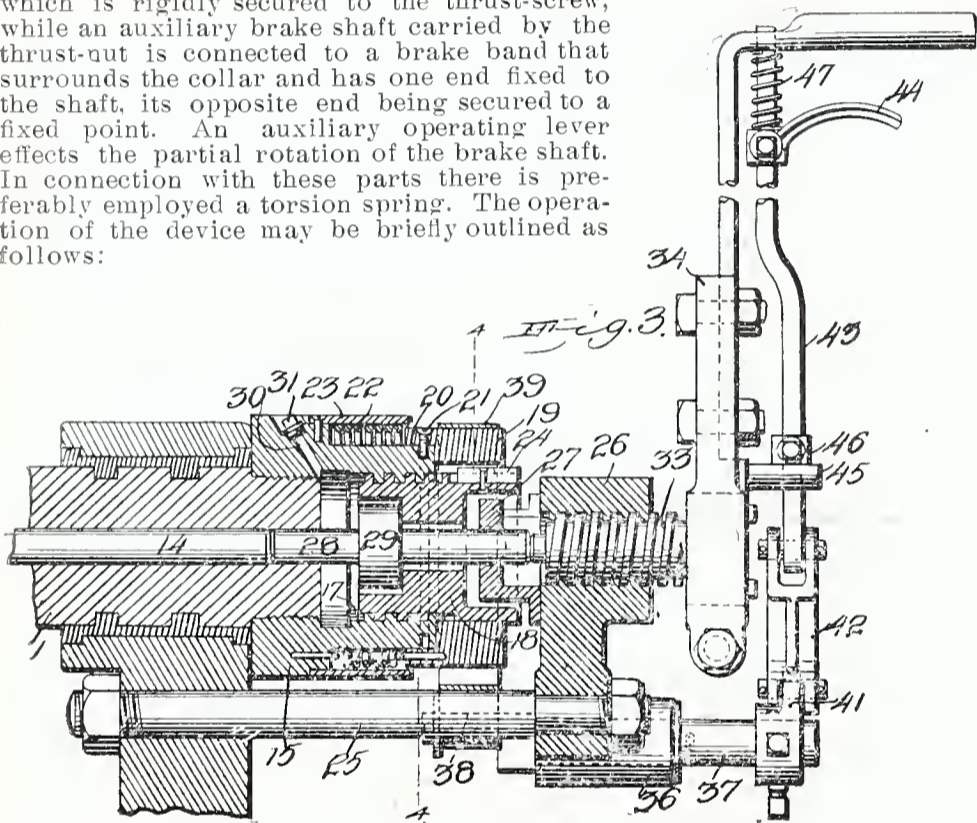
As a defence against this weapon of warfare, torpedo boat destroyers constitute the only effective means so far discovered. It is impossible to use nets when a vessel is moving, and the quick fire guns are useless if the torpedo boat eludes discovery. To maintain a cordon of the destroyers around each battleship may, indeed, prevent its becoming food for torpedoes, but will be found cumbersome and impracticable in actual engagements. Meanwhile, the range of the torpedo is being steadily increased. It will soon, it is believed, be able to traverse a distance of two miles, at a speed of thirty miles an hour.

CLEVER NEW PATENTS.

CLUTCH OPERATING MECHANISM.—NEW CINCHING DEVICE.—SHIELD.—
CARDING TOOTH TOOL.

Clutch Operating Mechanism.

On August 20, 1901, Mr. Edward Turney, of Portland, Oregon, obtained a patent on a friction clutch. Recently Mr. Turney has devised and patented improved means for effecting the operation of the clutch, this means being so constructed that the friction is greatly reduced by having all the strain taken up by the rotating shaft, when the clutch is engaged. Moreover, the device is more completely under the control of the operator, and the action is such that the clutch can be thrown from operative to inoperative relation almost instantly. The improved operating means is shown in the accompanying cut, which is a longitudinal sectional view. A portion of the main shaft is illustrated and designated 1. The shaft carries loose and tight clutch members, one of which constitutes one head of a winding drum. These parts are, however, not shown. A pin 14 is longitudinally movable in the shaft 1, and is borne against by another flanged pin 28, which passes through a rigid thrust-nut. Another nut carried by the shaft has a recessed screw associated and normally rotating with it. A collar loosely mounted on the nut is feathered to the screw, and the flanged pin extends through a central opening formed in the screw, and has its flange portion fitted within the recess of the same. A thrust-screw is carried by the thrust-nut above mentioned and is adapted to engage the pin. In connection with these parts an operating lever is employed which is rigidly secured to the thrust-screw, while an auxiliary brake shaft carried by the thrust-nut is connected to a brake band that surrounds the collar and has one end fixed to the shaft, its opposite end being secured to a fixed point. An auxiliary operating lever effects the partial rotation of the brake shaft. In connection with these parts there is preferably employed a torsion spring. The operation of the device may be briefly outlined as follows:



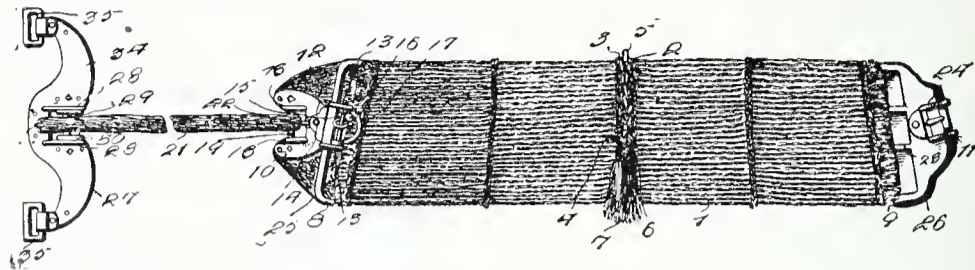
When it is desired to engage the winding drum with the shaft, the main operating lever is turned in such manner as to throw the screw 33 against the pin 28, the latter being thereby moved against the pin 14. After this movement, the handle of the auxiliary lever is raised and the shaft 37 thereby rotated to an extent sufficient to clamp the brake band on the collar 19, thus stopping the latter and the screw. The nut 15, however, continues to rotate with this shaft and consequently the parts become locked. During this movement, the torsion spring shown at 22 is wound and is maintained in this condition, so that its expansive force may be utilized when it is desired to loose the clutch. Upon unlocking the parts, through a suitable movement of the levers, the spring 27 returns to its normal position, thereby turning the collar 18, and screw 19, until both have assumed their initial and inoperative positions, which positions are shown in the accompanying cut.

New Cinching Device.

A device of great merit has recently been patented by Mr. Albion Paris Weeks, of Santa Cruz, California. Mr. Weeks has obtained several patents on cinching devices, and his present invention is the result of a steady development of his ideas and actual experience. The cinch plate, which possesses great strength and durability, is adapted to be applied to all kinds of saddles, whether single or double rigged, and is capable of affording free movement of the parts, whereby the same are prevented from rubbing and raising sores on an animal.

In the accompanying cut, which shows a cinch and a cinch plate, 1 designates the cinch, the body portion of which may be constructed of any suitable material, and which has plaited through it, a leather thong 2, extended at the front and center to form loops 3 and 4, for the reception of rings 5 and 6. The front ring is adapted to have a martingale connected to it, and the central ring extends through the head of a tassel 7. The cinch tapers transversely, being narrower at the front longitudinal edge. The ends of the cinch are secured to frames 8 and 9, which are centrally pivoted to buckles 10 and 11. The frame 8, consists of an oblong loop provided at the outer side with a central ear 12, and connected by transverse ears 13. The central ear receives a pivot 14, for securing the frame 8, to the cinch buckle

10, and the transverse ears 13, support a pintle 15, which receives a ring 16, and which hinges a curved loop 17, to the frame 8. The cinch buckle 10, consists of an approximately semi-circular plate having a rectangular recess or opening, and provided at opposite sides with ears or lugs 18, which are connected by a rod 19. The rod 19, is round and receives a sleeve or roller 20, to permit a girth strap 21, to move over it freely. The girth strap is engaged by a pivoted tongue 22, of the cinch buckle 10. The frame 9, at the other end of the cinch is provided with an oblong loop connected by cross

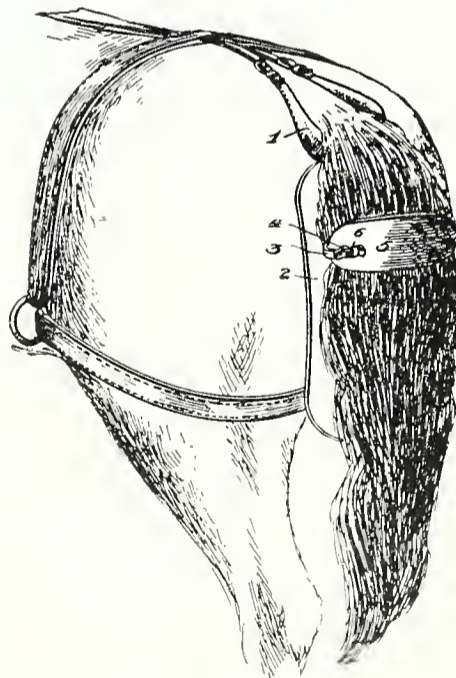


pieces 23, and provided with an ordinary buckle 24. Leather guards or shields 25 and 26, are arranged beneath the cinch buckles. The girth strap 21, extends from the cinch to a cinch plate 27, provided at its lower end with a recess and having flanges 28, at opposite sides thereof for supporting a pintle 29, which pierces a hinged frame 30. The outer end of the girth strap 21, is engaged by a hook 32, and is provided at intervals with holes, whereby it may be adjusted. The cinch plate is provided with curved arms 34, carrying pivoted loops 35, adapted to receive the saddle straps.

Shield.

A leading resident of Quitman, Ga., Mr. Washington P. Burke, a well-known inventor, has patented a very useful device in the form of a crupper shield for covering the rear portion of the body of a horse to prevent exposure of expelled excrement to the occupants of a vehicle. The object is to provide simple and effective means in connection with such device, whereby it may be raised simultaneously with the elevation of the animal, and fully clear the rear portion of the animal over which it normally depends in close relation.

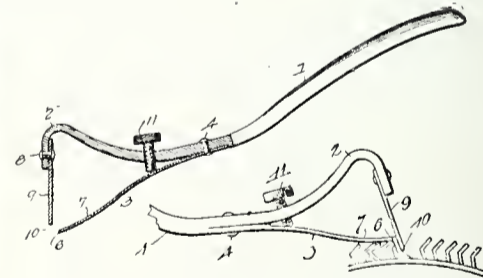
In carrying out this object the crupper 1, is of the usual form and attached in the ordinary manner, and to the center of the enlarged portion thereof at the rear, an elongated shield or apron 2 is permanently secured, being preferably composed of



5, consisting of a band of leather or the like, and having considerable width to provide an extended bearing over the tail of the animal to which it is applied. The holder also has loops 6, adjacent to the buckles 4, for securing the ends of the straps 3, and prevent the latter from curling or presenting an unsightly appearance, and also to hold the said straps in connected relation to the buckles. The holder 5, is located well up on the tail, so as to be positively affected by the stub of the latter and also to allow free use of the tail. The holder can be easily applied over, or released from, the tail by detaching or disconnecting either one end or the other.

Carding Tooth Tool.

Anyone having knowledge of carding machines is acquainted with the manner in which the teeth thereof become mashed and distorted during use, and the difficulty experienced in straightening the same. Such will therefore be interested in a tool for straightening the teeth of carding rolls patented by Mr. Noah G. Huffstickler, of Mount Holly, North Carolina; the assignee of a one-half interest is Mr. Eli C. Boyte, of the same place.



The construction and manner of using the device will be clearly apparent by referring to the cuts. The tool consists of a handle having at one end a goose neck 2, to which is attached a lifting plate 9. Secured to an intermediate portion of the handle is a resilient plate 3, constituting a gage plate, the free edge of the gage plate being parallel to the free edge of the lifting plate. This gage plate can be adjusted as desired by a screw 11, threaded through the handle and bearing against the inner side of the same. In using the tool, the lifting plate is placed in front of the tooth, and the gage plate back of it, with the free terminal of the former disposed close to or in the bend of the tooth, and the free terminal of the gage plate bearing against the end of the tooth. Consequently, by suitably operating the tool, the tooth section held therein can be properly rebent and returned to its normal position.

TWO NEW LIFE SAVING DEVICES.

DONVIG'S life boat—in the shape of a globe—was described in the INVENTIVE AGE some months ago; but recent experiments by European governments have again attracted attention to this novel apparatus, and makes it worth while to give additional illustration. In the official trials, the globe—hermetically closed, as shown

its total weight, including anchor, 100 fathoms of steel wire rope and other apparatus, was about 3,600 pounds. When provided with fresh water and containing 16 men, it draws about 2 feet of water.

The globe is constructed of steel plates about one-fourth of an inch in thickness, and has the form of a globe

Norwegian naval officers and other maritime authorities. Two life-saving globes were used for the experiment. They were both set out from the Norwegian man-of-war *Heimdal*. The first one had no human beings on board, but sand ballast corresponding to the weight of sixteen men. It was launched without trouble, and made a successful landing.

This fact ascertained by signals from shore to the *Heimdal*, the second globe was set out. On board this one were Captain Donvig, Marine Lieutenant Engelstad, and three sailors. This also cleared away from

the ships in good shape, and a few minutes after its being dropped into the sea one of the trapdoors was opened, the men crawled out, swinging the Norwegian flag, set up sails, and sheered through the breakers toward land. It made a successful trip, and half an hour later it landed. At the time it was blowing hard from northeast, and the sea broke on four feet of water. The globe landed about fifty yards from the mainland. The men got out and waded ashore. By experts it was considered that an ordinary lifeboat would have been of no use under the circumstances.



FIG. 1.—DONVIG'S LIFE-SAVING GLOBE.

in Figure 1, was thrown from a wharf 12 feet above the water. It sank, but recovered itself immediately. On rising to the surface, the portholes with which it is provided in the top were opened, and one of the occupants adjusted a sail and proceeded to guide the globe by means of a rudder, as depicted in Figure 2. The tests served as a further demonstration of the practicability of the invention. A commission of experts, appointed by the Norwegian government, declared that with the exception of sailing and manning (in which, of course, the shape of the vessel makes it clumsy) the life-saving globe is superior to any modern ship's life boat, and when seamen and passengers have the advantages of the globe explained to them, they will doubtless prefer it to the open life boat. It requires less deck space than an ordinary life boat, and costs about \$500.

The globe used in the experiments was about 8 feet in its greatest inside diameter: its height was six feet: the space enclosed was 265 cubic feet, and

from which a segment is cut off, the flat part forming the bottom, which is double, the outside one being 5-16 inch thick. It is equipped with a fender of 16-inch coil rope; an anchor with 100 fathoms of steel wire rope; a wooden grating on top of the inner bottom; straps and loose reindeer padding, provided for 16 men: a bilge pump; a rudder and tiller, and sails and oars.

Arranged around the interior of this novel vessel are a series of lockers, which serve as seats for the crew. In these lockers can be stored provisions. The space between the double bottom is arranged to hold fresh water to the amount of about 150 gallons. In the upper part of the globe are manholes, which can be opened and shut from within. Through the top a ventilating pipe, 12 inches in diameter, can be raised from the inside of the globe to the height of about 5 feet above, or this can be lowered so that the top end is flush with the top of the globe. This pipe is fitted with a cover, and has packing in the top for quick opening and closing for purposes of ventilation.

Recent trials were conducted on the coast of Jutland in very stormy weather, under the supervision of

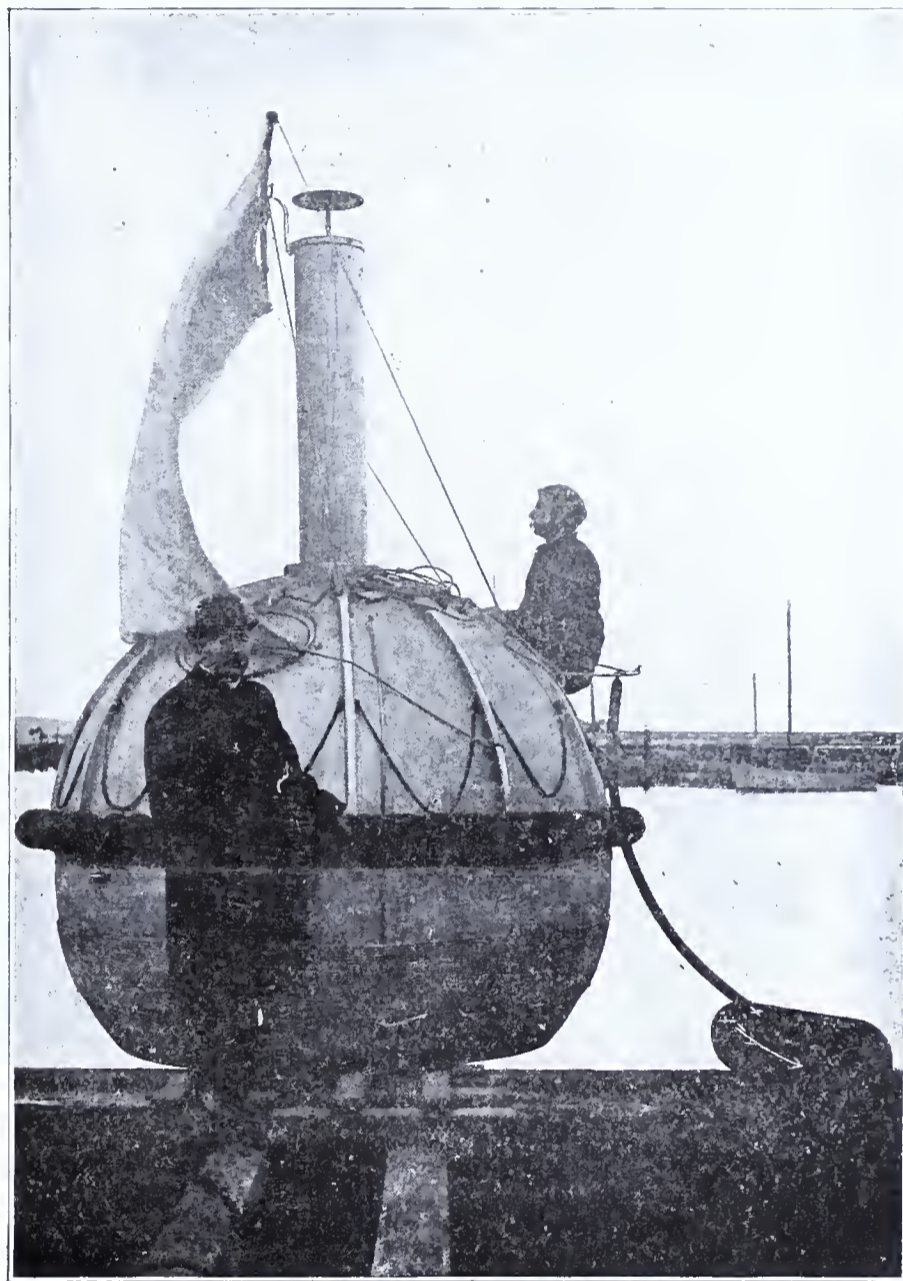


FIG. 2.—DONVIG'S LIFE-SAVING GLOBE.

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MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been procured
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Andrew Fleming, Brooklyn, N. Y. Adjustable Support and Leaf Holder.—Two patents were required to entirely cover all the features of this invention, which relates to means for supporting books and papers at different inclinations upon a desk or table. A horizontal base frame is employed adapted to rest upon the desk or table, and carrying a yieldingly supported locking stirrup that engages racks fastened to the under side of a platform, hinged to the base and adapted to lie flat upon the same when the support is folded. The supporting stirrup is operated by a bar hinged to the under side of the platform, and adapted to engage the stirrup to carry and hold the same out of engagement with the rack. These features are covered by one of the patents. The other patent relates more particularly to a novel leaf-holding device consisting of an arm having a coiled spring at one end, which spring has a pivotal connection with the platform. The other end of the arm is provided with an eye, and in the eye is pivotally mounted a cross bar formed of a single piece of wire peculiarly bent, which cross bar is adapted to rest against the leaves and is held in proper position by the spring-pressed arm.

Lute E. Campbell and William B. Weaver, Weatherford, O. T. Dispensing Cabinet.—The object of the invention is to provide a cabinet in which the contents are maintained in separate compartments which are in communication with a single discharge opening, means being provided for controlling the discharge from each compartment through the common discharge opening. A further object is to arrange the weighing mechanism within the base portion of the cabinet, whereby it will receive the material from any one of the compartments, and at the same time can be conveniently read from the exterior. The invention consists of a plurality of upright compartments grouped about a vertical axis, the bottoms of the several compartments having discharge openings, and substantially radial endwise-movable closure slides for the respective openings, the inner ends of the closure slides normally lying in mutual engagement to limit the inward movement thereof.

Isbon Metzger, Winfield, Iowa; Oliver Metzger and Samuel Metzger, administrators of said Isbon Metzger, deceased. Two patents. Hub Bearing and Vehicle Hub.—The first patent has for its object to effectually distribute the lubricant throughout the entire portion of the axle spindle, and to maintain a circulation of the lubricant from one end of the spindle to the other; also to provide an oil reservoir from which the oil is fed to the bearing surface between the spindle and the axle box by the tilting of the axle. The device is provided with a spindle having a longitudinal groove formed in its top and inclined downwardly from its inner end portion towards the outer end. The axle box is provided at its inner end with an internal annular chamber in constant communication with the inner end portion of the groove, to take up oil and carry it back into the said groove. The oil reservoir is carried by the outer end of the axle box, and is in communication with the outer end of the groove, whereby a continuous circulation of oil is maintained from the outer end to the inner end of the spindle, and back again to the outer end.

The object of the second patent is to stiffen and strengthen the hub, and to

provide a simple and efficient construction, whereby the axle spindle is braced, and the inward thrust of the hub effectually taken up. The spindle is provided at its inner end with an outwardly projecting cylindrical cup. The inner end of the axle box is projected into the cup, and is of less diameter than the same, to provide an annular space between the box and the cup. The inner end of the box is also provided with an external annular shoulder spaced from the inner end of the box and having a working-fit within the cup. The annular space between the box and the cup is filled with washers.

James C. O'Donal, Mexico, Mo. Devices for Oiling Floors.—Two patents have been recently issued to Mr. O'Donal for a device adapted to be applied to an ordinary broom or brush, and capable of holding a comparatively large amount of oil or other liquid, and of distributing the same uniformly in any desired quantities to the brush or broom, and also to the surface, over which the brush or broom is moved.

The first patent comprises a reservoir having an intermediate tube to receive the broom handle, and provided with portions depending on opposite sides of the broom head to its line of bending. Exteriorly arranged oil distributing means are connected with the ends of the depending portions and spaced from the sides of the broom head, whereby when the lower portion of the said broom is flexed in either direction, it will assume a position beneath one of the depending portions, and its distributing means, and out of the vertical plane in which the other depending portion is located. This feeds the oil simultaneously to the broom and directly to the floor. The flow of oil to the distributing means is controlled by a valve operable from the top of the device.

The second patent comprises a reservoir having spaced depending portions located at opposite sides of the broom head, and forming a seat for the same. The distributing tube is arranged between the depending portions of the reservoir in position to pass through the broom head. This distributing tube communicates with both of the depending portions of the reservoir, and it discharges the contents of the latter within the broom head. The flow of the oil or other liquid is controlled by a valve located at one end of the distributing tube.

Gilbert L. Baker, Oakdale, Cal. Combination Tool.—This tool is especially designed as an emergency repair outfit, and includes in a single structure the various appliances which are necessary for effecting the repair of any portion of a harness which may be accidentally broken or deranged. The general form of the tool is that of a hammer, in one side face of which are fixed a cutter and gauge for properly trimming the ends of a piece of leather preparatory to uniting the same. To the under side of the head of the hammer are fixed a die and a nipper member, and upon the hammer handle are mounted the swinging operating levers or handles of a punch and nipper, which cooperate with the die and nipper member carried by the head. The lower end of the handle, which is removable and is formed with a chisel, is provided with an upsetting recess, and in one face of the hammer handle is formed a pocket for the reception of a needle, the pocket being closed and protected by the handle of the nipper. By means of this device the broken ends of a piece of harness may be trimmed and punched, a rivet may then be passed through the punched openings and, after being clipped by the nipper, may be upset. If it is necessary to sew any part of the harness, the needle may be removed from its pocket and used.

Christian F. Recknagel, of New Britain, Conn. Ice Creeper.—This is a very ingenious little device adapted to be secured to the bottom of the shoe just in advance of the heel. It comprises a body plate formed of sheet metal having its opposite ends turned down to form flanges, one of which is longer than the other. The flanges are serrated and sharpened to form teeth that project sufficiently below the shoe to engage ice or packed snow and prevent the foot slipping. The means for securing the plate to the shoe consists of spaced sets of jaws slidably mounted on the under side of the plate and projecting above the same so as to engage the sole of the shoe. A cam journaled upon the under side of the plate has eccentric connections with the jaws to move the same, and is furthermore provided with a handle projecting from one side and arranged to abut against the heel of the shoe. A locking cam is secured to the above mentioned cam, and fits between the sets of jaws so as to hold them in clamped position.

John M. Brasington, Bennettsville, S. C. Threshing Machine. Two patents.—These two patents are the latest of a series of patents which cover the various developments of a novel pea thresher and vine shredder invented and perfected by Mr. Brasington. The first of these patents discloses a wheeled casing equipped with threshing mechanism in the form of three spiked cylinders, between which the vines are carried in different directions. These cylinders rotate in different directions and at different speeds and thrash out the peas from the vines. Above one of these cylinders is located a feed roller which mashes the vines into close engagement with the spikes. At the point where the mass of vines is broken to pass down between two cylinders, a swinging vine cutter is mounted in position to shred the vines and to cut the heavier portions thereof into short lengths. The peas liberated from the vines by the threshing mechanism, drop down through a perforated concave upon a shaking screen, which separates the dust and debris from the peas and discharges them upon a fixed incline, down which they gravitate in the face of a blast from a blower, and are finally discharged into a grading shoe. The vines, after leaving the threshing mechanism, are carried back over a fixed screen by an endless conveyer, and during this passage of the vines to the discharge end of the thresher, such peas as are held thereby are liberated, and falling through the screen, are deposited upon a fixed incline down which they roll in the face of the blast, with the body of peas received by the fixed incline from the threshing mechanism.

The other of these patents has special reference to certain improvements in the machine, which not only render it more efficient for the threshing of peas, but also make it capable of threshing corn just as it comes from the field without necessity for husking the ears, or even separating the ears from the stalks. In this machine the threshing mechanism comprises two cylinders instead of three, and a single concave located under the rear cylinder only, is employed. In rear of the threshing mechanism is located a dust chamber into which the vines are carried by the threshing mechanism, and from which they are carried back over the fixed screen by the endless conveyer, as in the patent first described. The peas or corn liberated by the threshing mechanism are deposited upon a shaking incline which, instead of discharging upon a fixed incline, is arranged to discharge the peas upon the front of the fixed screen, over which they are carried with the vines by the conveyer. As the peas drop from the fixed screen, they fall upon a shaking incline, down which they gravitate in the face of a blast, and are

deposited upon a shaking screen which separates the dust and dirt therefrom, and deposits them upon a second shaking incline, down which they gravitate in the face of a second blast before being delivered to the grading shoe. The patent shows the blower having separate spouts for producing these independent blasts to which the peas are successively subjected, but it is obvious that separate blowers might be employed for this purpose, if found desirable.

Jacob Zeigler, Coffeyville, Kansas. Harness Trace Buckle.—This buckle is designed especially for adjustably connecting the trace and hame straps, and is an improvement on a former patent granted to the same inventor in 1892. In that structure a buckle frame is provided that is detachably and adjustably secured to one strap by means of a projecting stud, and is provided with forwardly extending forked fingers engaged by a loop attached to the end of the other strap. The great objection to the same has been that the entire strain is transmitted to the stud, thereby causing either the breakage of the latter, or the tearing out of the hole in which it is placed. This objection is overcome in the present device wherein a loop is employed, arranged to be secured to a strap, and comprising side bars having interturned ends connected by a cross bar. The frame, which is secured to the other strap, has forwardly projecting inclined side fingers that extend diagonally across the edges of the straps and over the cross bar of the loop. The fingers have smooth under faces, and are furthermore provided with terminal hooks that engage over the side edges of the strap. Thus the cross bar will be clamped between the fingers and the strap held thereby, and the strain upon the stud, which is still employed, is greatly lessened.

Albert H. Lamb, Elbon, Pa. Music Leaf Turner.—The music leaf turner of this patent is designed especially for supporting book and sheet music in position on a piano, and it is adapted to hold such music in convenient position to be read by the performer, and is capable also of successively turning the leaves in an effective manner. The device is provided with a flat body, having a transverse series of pins for supporting the music. A casing is mounted on the body below the pins, and a plurality of upstanding shafts pierce the top of the casing, and lie one in front of the other, the upper ends of the shafts being projected above the casing in progressive succession from front to rear. These shafts are provided at their upper ends with laterally projecting arms which receive tubular telescoping members, and the latter carry spring fingers for engaging the leaves. Two sets of keys are provided for partially rotating the shaft in opposite directions. These keys are connected with the shafts by racks and pinions, and enable the leaves to be conveniently turned in either direction.

John A. Heintz, Menomonie, Wis. Brick Mold.—The inventor's aim is to provide a mold that will better withstand the rough usage and hard wear to which such structures are necessarily subjected, without becoming warped or misshapen. Metallic side walls are provided having on their outer edges a series of intermediate bosses provided with sockets. These walls also have marginal flanges. Transverse wooden partitions form the mold chambers, and have projections or studs to fit in the sockets of the side walls. Wooden bottoms close the spaces between the partitions and are secured by bolts passing through the lower flanges, while tie bands extend respectively across the upper edges of the partitions and beneath the ends of the bottom pieces.



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THE EDISON CHARGES.

Sometime ago there appeared in the papers a complaint by Thomas A. Edison against the Patent Office, to the effect that one of the examiners of the Patent Office force had permitted a rival inventor to amend his application to include features not originally embraced therein, but shown by Edison in one of the latter's applications. In another part of the AGE we print the report of Assistant Commissioner Moore, who acted on the complaint of Mr. Edison.

The prevailing practice of the Patent Office is to refuse the admission of any amendment of an application, which amendment attempts to incorporate matter not originally disclosed in the application. The rule, as stated in the "Rules of Practice" of the United States Patent Office, is as follows:

"In original applications which are capable of illustration by drawing or model, all amendments of the model, drawings, or specifications, and all additions thereto, must conform to at least one of them, as it was at the time of the filing of the application. Matter not found in either, involving a departure from the original invention, can be shown or claimed only in a separate application."

This rule admits of no exception in any case. It makes no difference what showing an inventor may produce that his original invention contemplated the particular features sought to be embraced by amendment, and that he intended to have the application cover the same. The Patent Office would simply decide against the admission of the amendment. There are no favorites. The rule is insisted upon by the Patent Office in every case. Therefore, the statement by Mr. Edison, that some rival claimant for a patent had been permitted to amend his application to include features not originally shown therein, but which were disclosed in one of Edison's applications, is a serious charge. The effect of such

practice would be to allow favored applicants for patent to obtain the benefit of their filing dates, as evidence of constructive reduction to practice in an interference contest, of matter introduced by amendment. If this was permitted to be done, it could only have been through collusion with the examiner, for the system of keeping the papers of applications on file at the Patent Office is such an excellent one, that it would be impossible for an applicant alone to surreptitiously incorporate an amendment embodying new matter.

We are loath to believe that there is any examiner in the Patent Office who would stoop so low. We do not, of course, consider the administration of affairs at the Patent Office to be perfect. It is open to criticism, and we have, in the past, seen fit to criticize the Office wherever we felt that unwarranted practices were being promulgated; but there is a difference between criticism based on honest differences of opinion as to the validity of certain practices, and a criticism which charges fraud on the part of officials of the Patent Office. We would be inclined to require proof beyond a reasonable doubt before we would accept any statements charging fraud on the Patent Office Examiners.

There have been instances of individual depravity. For instance, some years ago, the Chief Clerk of the Patent Office was dismissed because it was found that certain cash remittances to the Patent Office were being made away with, and it was clearly established that he alone was responsible for the losses. We have also known of a few instances where assistant examiners have pursued the practice of borrowing money from attorneys who had applications pending in their divisions, but the number of such men can be counted on the fingers of one hand, and even they have been removed from the Patent Office.

What ground, if there was any, for Mr. Edison's complaint, was probably due to the ignorance of some of the new examiners who have recently been admitted to the Patent Office. As is well known by practitioners before the Patent Office, the corps of examiners is constantly changing. Perhaps there is not another bureau of the government, where men remain such a short time as in the Patent Office, and it is also true that there is no other bureau of the government which requires such a long time for a man to become proficient. It frequently happens that by the time he has become of use in the Patent Office, an assistant examiner finds a way open to resign and take a position outside, having a larger salary.

This brings us to the proposition so often advanced in the columns of the AGE, that if examiners were paid salaries commensurate with the importance of their positions, fewer resignations would take place, and the Patent Office would retain the men after they have become valuable through experience. If inventors like Edison would exert their influence towards increasing the pay of examiners of the Patent Office, they would do more service to themselves and to that class of the public which deals with the Patent Office, than by filing charges of fraud.

WHEN A CAVEAT SHOULD BE FILED.

There seems to be considerable misapprehension as to the purpose of filing caveats in the Patent Office. Some inventors think that a caveat differs only from a patent, in that the former protects the inventor for one year, whereas the latter runs for a period of seventeen years. To gain light on this subject, one need only refer to the provisions of the statute, which are as follows:

"Any citizen of the United States who makes any new invention or discovery, and desires further time to mature the same, may, on payment of the fee required by law, file in the Patent Office a caveat setting forth the design thereof, and of its distinguishing characteristics, and praying protection of his right until he shall have matured his invention. Such caveat shall be filed in the confidential archives of the Office and preserved in secrecy, and shall be operative for the term of one year from the filing thereof, and if application is made within the year by any other person for a patent with which such caveat would in any manner interfere, the Commissioner shall deposit the description, specification, drawings, and model of such application in like manner in the confidential archives of the Office, and give notice thereof, by mail, to the person by whom the caveat was filed. If such person desires to avail himself of his caveat, he shall file his description, specification, drawings, and model within three months from the time of placing the notice in the Patent Office in Washington, with the usual time required for transmitting it to the caveator added thereto; which time shall be indorsed on the notice. An alien shall have the privilege herein granted, if he has resided in the United States one year next preceding the filing of his caveat, and has made oath of his intention to become a citizen."

Quite recently the law has been amended so as to permit aliens to file caveats, but with this single exception, the law is as stated above.

A caveat is in effect a notice to the Patent Office that the caveator claims to be the first and true inventor of the invention therein described. Its effect is to prevent the grant of a patent for the same invention, without notice to the caveator, in case an application for patent should be filed by another inventor during the life of the caveat. Thus, it simply entitles the caveator to a certain notice. It does not afford him any protection against public use, neither does it show due diligence in perfecting his invention and reducing it to practice. It gives him no material advantage over any rival claimant, who may subsequently file a caveat, or an application for a patent, nor does it impose upon him any obligation to present an application on his own behalf, or oppose the issue of a patent to his rival. It has been held that if a caveator during the time which may elapse from the filing of his caveat and the filing of an application of the patent, allows his invention to go into public use, his caveat will not protect him.

In an interference proceeding, a caveat is only evidence of the conception of the invention, but it is the best possible evidence, since the disclosure is made to the Patent Office. If an inventor makes an invention, and does not wish to take any one into his confidence, the best thing for him to do is to file a caveat in the Patent Office, for

without this he would have difficulty in showing his priority in the event of a contest. He would need no better proof of his conception than to produce a certified copy of the caveat.

A caveat, after it has been once filed in the Patent Office, cannot be withdrawn by the caveator, either for the purpose of amendment, or any other purpose. If the caveator should make any improvements after filing the caveat, he should file a new caveat based on the improvements, or take his chances and wait until he is ready to apply for the patent.

The law makes no provision for an assignment of a caveat, or of the right to notice which it is thus intended to secure, though it is apparent that the invention described in the caveat may be transferred under such terms of contract as shall protect the assignee, by obliging the inventor to proceed with his application for patent upon receiving notice from the real owner of the invention. In such case, the caveat simply serves as a means for identifying the invention applied for, in preparing the assignment.

A caveat should never be filed on a completed invention, that is, one which the inventor has tested and found to be complete and perfect in every respect. It is a waste of time and money to do this, for the reason that a caveat is no evidence of reduction to practice, whereas, an application for patent furnishes such proof. Where an invention has been tested and found to work satisfactorily, an application for patent should always be filed, and particularly so since the money paid for filing a caveat cannot be subsequently applied towards filing an application for patent.

When a caveat is received in a division of the Patent Office, the Examiner considers it and endeavors to fix the invention in his mind, so that should an application for patent be filed embracing the same invention, the caveator may be notified. The practice which formerly obtained was not to notify the caveator until the question of patentability of the invention, shown and described in the application for patent, had been definitely determined; but the course now pursued, is to send a notice to the caveator immediately on the filing of an application for patent embracing the same invention set forth in the caveat.

It has happened in the past that patents for the same invention covered by caveats have been allowed to issue, but wherever this has occurred, it has been found to be simply carelessness on the part of the Examiner. This would never happen if a proper scheme of examining caveats was devised. If each caveat was classified as soon as it was received in a division of the Patent Office, and a digest made of the construction set forth therein, or if caveats were searched in every instance before an application for patent was allowed to go to issue, there would never be the complaint, which has been so often made, that a caveat furnishes no protection to an inventor.

The truth is that there is nothing superior to the filing of a caveat under certain circumstances. In fact, it is a waste of time and money to file

an application for patent on an incomplete invention. It is more often due to the defective preparation of the specification and drawings accompanying caveats that mistakes are made in the Patent Office. Attorneys quite frequently file phonographs, and rough sketches in the Patent Office to accompany caveats, instead of making clear, well-defined drawings to show up the invention. While the same particularity of illustration is not required for a caveat as for an application for patent, yet it is necessary that the invention should be clearly described and shown, in order that the Examiners of the Patent Office may understand the invention embraced in the caveat. Unless, therefore, the papers are carefully prepared, the invention clearly set forth, and proper drawings made, a caveat is of no value to the inventor. The Patent Office enjoins this on all applicants when it says:

"A caveat must set forth the object of the invention and the distinguishing characteristics thereof, and it should be sufficiently precise to enable the Office to judge whether there is a probable interference if a subsequent application is filed for a similar invention."

A caveat runs for one year and may be renewed from year to year. There is no limit to the number of renewals of a caveat. If a caveat be not renewed, it will still be preserved in the secret archives of the Patent Office, though it is no longer operative.

Trademarks in Japan.

The focussing of public attention on the two countries now waging war in the East, has brought into prominence the fact that many Americans engaged in business with Japan have lost money—as well as the prestige of the particular goods which they placed on the market there—through ignorance of the trademark laws of that country. The regulations governing trademarks in Japan differ widely from those in the United States. Of late years, there has been a notable extension of our trade with Japan—we now sell her more goods than any other country, save England—but our exporters have not taken the proper precautions to protect their trademarks. In the United States, trademark protection is accorded to the person who can prove priority of adoption in Japan—as well as in other foreign countries. It is given to the person who first applies for the registration of the mark, no matter who he may be. Manufacturers who have not registered their trademarks in Japan are threatened by a serious state of affairs, as certain parties there have been registering a number of the most famous American trademarks, thus practically stopping the business in articles covered by such registrations, the trade having been warned that anyone will be prosecuted for selling goods under these trademarks, except when purchased through the parties who have wrongfully registered the same. Japan is a member of the International Union for the Protection of Industrial Property, and has a treaty with the United States, as well as with European countries, in which she guarantees to the citizens of these foreign countries the same protection of patent rights, and the use of trademarks and copyrights, as is accorded her own citizens by those nations; but protection in the enjoyment of any of these rights is dependent upon their registration. Our sewing machines, our flour, our malted milk, our typewriters, etc., have a good market in Japan, and it would be well for those who transact business with the Empire to comply with the formality described.

MR. EDISON'S CHARGES.

The assistant attorney general for the Interior Department has reported that he can find nothing that calls for the exercise of supervisory authority by the Secretary of the Interior in the matter of the report of the investigation of the charges of Thomas A. Edison against two examiners in the Patent Office, and that the Commissioner of Patents should be left to his own discretion in dealing with the matter. Secretary Hitchcock has approved the opinion of Assistant Attorney General Campbell and has ordered the case sent back to the Patent Office. The two examiners in question will be transferred to other divisions from those over which they now preside.

This decision of the Secretary is the outcome of the investigation which was instituted in the Patent Office several weeks ago by order of the President, to determine whether or not there was collusion between the examiners in the Patent Office and an inventor named Ernest W. Jungner in the case of a patent granted to Jungner for a reversible galvanic battery.

Mr. Edison charged incompetency, neglect of duty and maladministration of office. The charges were filed before Commissioner Allen before he left for his summer vacation, and after investigating the case the Commissioner refused to grant a hearing to Mr. Edison on the ground that the evidence did not warrant an investigation.

The case was taken to the President, and a hearing of the case was ordered from the White House. In the meantime Commissioner Allen left the city for his summer vacation, and Assistant Commissioner E. B. Moore heard the case. Mr. Moore's opinion was forwarded to the acting secretary of the interior, Judge Ryan, about three weeks ago, and after carefully considering it Judge Ryan forwarded it to the Secretary, on his return to Washington last week. The papers were then sent to the assistant attorney general for his opinion and report, which was rendered yesterday. The report of Assistant Attorney General Campbell was in conformity with the findings of Assistant Commissioner Moore and was virtually an approval of them. Mr. Moore's findings, summarized, follow:

"The examiners are charged by Thomas A. Edison with incompetency, neglect of duty and maladministration of office in connection with the grant of United States patent to Ernst W. Jungner for reversible galvanic battery, No. 738,110, dated September 1, 1903. The specific charges are three in number.

"The substance of the first charge is that the examiners allowed the Jungner patent to issue as a division of Jungner's prior application, when they knew, or should have known, that this issue was fraudulent, for the reason that Jungner's original application, a certain narrow invention in storage batteries was disclosed; whereas in the patent issued to him the specification was amended by the addition thereto of new matter, and claims were granted based upon the amended application.

"The substance of the second charge is that the examiners allowed patent No. 738,110 to issue to Jungner con-

taining claims which they knew were unpatentable, which they had admitted were unpatentable, and which Jungner himself acknowledged were unpatentable.

"Of the twenty claims allowed in the Jungner patent but four of them are specifically referred to in this charge.

"The substance of the third charge is that the examiners granted the Jungner patent on an inoperative combination, of which fact they had full knowledge.

"In connection with the three charges, Mr. Edison complained of the declaration of an interference between one of his applications and the parent application of Jungner, and asserted that the declaration of this interference was improper and assists in showing that the examiners were incompetent. He further complained that it deprived him of the opportunity of showing that Jungner's invention was inoperative.

"The findings were that there was absolutely no evidence of malfeasance or intentional wrong-doing on the part of the examiners, and that the second and third charges were not sustained and should be dismissed. As to the declaration of the interference, it was found that the examiner in view of all the circumstances did not depart from custom, and acted in accordance with the dictates of common sense, and that Mr. Edison was not deprived thereby of an opportunity of making a further showing as to what was contained in the Jungner application, but, on the contrary, was expressly given that opportunity, and failed to take advantage of it.

"As to the first charge, it was found that the examiners failed to appreciate the nature of the enlarged description of the Jungner patent, and that they should have appreciated the effect of this enlarged description, and it was sustained only as to this particular."

Welding Steel.

An apparatus for welding iron and steel has been invented by Abram C. Allen, of Dayton, Ohio, and has been assigned to Eugene Kennedy, of Montgomery County, Ohio. In the present method of forging iron and steel, the parts to be united are placed in a furnace and brought to the desired condition, when they are cemented by hammering either by hand or power. It is evident that this welding in order to be successful must be very quickly accomplished, on account of the rapid cooling of the heated metals when exposed to air. In case of failure, the parts must be again reheated, involving loss of time and more or less impairment of the parts themselves. In the present invention, this objection is obviated by cementing the parts together in a highly heated atmosphere and in preference to the furnace itself.

The furnace employed, which is of the usual form of a gas or oil burner heating furnace, is provided at the end nearest the door with an anvil, projecting slightly above the floor of the heating-chamber. This anvil is firmly supported and has its upper end recessed, and connected therewith are water-pipes for providing a current of water into and out of said recess in the furnace for cooling the same. Above the furnace is operatively mounted a hammer, and the roof of the furnace is provided with an opening directly below the hammer. The hammer is so located and supported that it can drop through the opening upon the anvil. Guideways support the hammer and also control

its upward and downward movements. When not in use, the hammer is retained above the roof of the furnace. When raised to this position, during the heating of the parts to be united, the aperture in the roof of the furnace is closed by a cover.

In operating the device, the parts to be united are placed in the furnace beyond the anvil. The burners are ignited and kept in operation until the parts to be welded have been raised to the required temperature. The cover is then removed, the parts are drawn forward on the anvil, and the hammer dropped upon them. If the parts are of such extent that they are not completely united by this operation, they are then drawn forward and the hammer again dropped, and this is repeated until the parts have been completely welded or cemented together.

Producing Iron.

A process of producing iron or steel direct from ore has been invented by Walter M. Brown and Dexter Reynolds, of Albany, N. Y. The object of the invention is to provide a new and improved process for the producing of iron or steel direct from the ore. The process consists of mixing granulated oxid of iron ore and a sufficient granulated carbonaceous material to deoxidize the ore and carbonize the iron in it to the extent required to produce the grade of iron or steel desired; introducing this mixture into revolvable crucibles preferably set in a revolvable shell or furnace; heating this shell or furnace by the waste products of combustion coming from the melting or fusing furnace; revolving the crucibles in order to thoroughly mix and continually stir the mixture of oxid of iron and the carbonaceous material, so that the particles may make as many points of contact as possible in order to take advantage of the principle that deoxidation and carbonization take place only at the points of contact; continuing this stirring and mixing and the heating of the crucibles until the iron in the ore is deoxidized and carbonized to the desired extent, and during this process protecting the mixture in the crucibles from the direct action of the products of combustion used in heating the crucibles and their contents, in order that there shall be no deleterious effects from the products of combustion upon the mixture during the process of deoxidization and carbonization; after deoxidization and carbonization have taken place to the desired extent then, at a suitable time, adding to the mixture flux sufficient in quantity to remove impurities. The crucible in which the flux is entered is revolved, and the mixture emptied into other crucibles, said second set of crucibles being set in a melting or fusing-furnace, which is heated until the mixture is fused or melted, and then revolving said crucibles containing the melted mass so as to empty them into any desired receptacle, the crucibles being so arranged that the mixture is protected from the direct action of the products of combustion of the melting or fusing furnace.

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Bucket or pail fastener R. Steidl
Burglar and fire alarm M. Nickels
Burner J. D. Green
Button. Combination collar and cuff A. E. Strang
Button. Garment R. Steiner
Cabinet L. Pederson
Cable grip T. J. Cook
Cable tension regulator. Overhead J. F. & D. J. McKay
Camera focusing device M. Schell
Camera. Photographic H. P. Tattersall
Camera. Photographic J. A. Pautasso
Can capping machine F. Rogers
Can capping machine J. T. Wilmore
Cans. Apparatus for exhausting air from
fruit R. C. Davis
Candy flattening machine H. G. Lange
Cane crusher. Sugar H. Wilson et al
Car brake W. Gossett
Car brake and starter. Combined H. E. Kellogg et al
Car. Dump A. King
Car engines. Apparatus for controlling the
speed of motor A. Krebs
Car fender H. Howe
Car fender E. Sherwood
Car friction and direct acting spring draft
rigging combined F. B. Townsend
Car. Motor W. G. Wilson
Car or engine replacer F. J. Fewings
Car. Ore C. Canclini
Car replacer C. A. Fischer
Car wheels. Making H. V. Loss
Cars. Flexible metal pipe coupling for con-
necting the air and steam pipes of railway G. D. Pettingell
Carbid. Producing W. S. Horry
Carbureter S. A. Lockhart
Cashiers, registers, and recorders. Keyboard
mechanism for mechanical I. S. Dement et al
Casting machine J. Bijur

Casting open work structures. Apparatus for J. Bijur
Cement kiln cleaning machine C. J. Van Doren
Cementing material and making same T. W. Cappon
Chain. Drive E. F. Morse
Chair fan or mirror attachment. Rocking J. F. Yoho
Chopping block. Butcher's J. T. Nichols
Christmas tree candle holder H. G. Hess
Chuck C. R. Moon
Cigar manufacturing machine B. Wertheimer
Cigars with smoke improving portions. Pro-
viding H. F. M. Thoms
Circuit controller for induction coils R. Varley
Clothes drier P. A. Ringnell
Cluster socket J. H. Dale
Clutch mechanism W. D. Ford-Smith et al
Coal tippie structure T. W. Fitch, Jr
Cock safety attachment. Gas B. F. Edwards
Coffee roaster J. E. Herriott
Coin controlled apparatus W. Webber
Coin controlled dispensing apparatus D. Sullivan
Coin counting and packaging machine E. N. Gilfillan
Coin detector F. G. Hartell
Coke oven. Retort A. C. Kloman
Coke oven. Retort W. M. Scott
Coloring machine A. C. Hough
Commutator. Automatic J. H. Mercadier
Compound engine S. Rothschild
Computing machine J. A. Scott et al
Concrete piles. Sectional core for making G. H. Poor
Conveyer spout coupling. Sectional C. F. Spencer
Conveying apparatus. Material H. Marcus
Cooking retort or kettle O. Hubbell
Cooling apparatus E. P. F. Magniez
Copper and zinc from ores. Electrically ex-
tracting S. Laszcynski
Cot P. D. Heather
Cream separator C. T. McCarrall
Cultivator O. H. Cloyd
Curtain and shade roller holder. Combined
window A. F. Gilbert
Curtain drying and stretching frame. Lace G. F. Hullings
Curtain fastener F. P. Pfeiffer
Dam. Portable power T. F. Gilliland
Dental appliance W. T. Lyon
Desk. Hotel register J. I. Haycraft
Disinfecting apparatus A. Giersiepen
Display rack or case C. D. Allen
Distillation of wood and production of char-
coal. Apparatus for the H. A. Mackie
Draft and buffing mechanism F. W. Ritter, Jr
Draft device C. R. Davis
Draft equalizer E. F. Moran
Dredger or shaker. Powder C. E. Grapevine
Drilling and automatic centering device J. J. McElwain et al
Dust guard E. Jacquemin
Dyeing apparatus. Automatic J. Marshall
Electric arc rupturing device S. H. Short
Electric controller A. C. Eastwood
Electric furnace W. S. Horry et al
Electric lighting and power system W. A. Turbayne
Electric motor. Reciprocating A. F. Christmas
Electric resistance furnace E. F. Price
Electric switch G. H. Whittingham
Electric switch C. F. Hopewell
Electric switches or the like. Means for pro-
tecting live parts of W. McPevitt
Electrical generating system W. A. Bole
Electrolytic deposition apparatus W. J. & J. H. Jory
Electrotype plates. Mechanism for holding C. W. Eberhard
Elevator brake mechanism A. Sundh
Elevator hoisting gear A. Sundh
Embossing machine H. S. Maidhof
Embossing machine platens. Rotary support
for H. S. Maidhof
End gate O. B. Reynolds
Engine whistle attachment. Gas W. L. Paul
Engines. Fly-wheel for quick running inter-
nal combustion F. Reichenbach
Envelop and sheet of paper. Combined R. N. Wilt
Envelop fastener G. D. Barber
Envelop or expanding wallet A. Bushnell, Jr
Excavators. Car placing attachment for H. H. George, Jr
Excavators. Car placing attachment for
power H. H. George, Jr
Exercising apparatus G. Yoerger
Explosive compound J. P. Arnold
Explosive engine H. R. Palmer
Extension table J. & F. Dobrodenska
Eye shade N. R. Wickersham
Eyelid J. C. Engels
Fan F. N. Roehrich
Fan. Electric F. N. Roehrich
Fan for disinfecting purposes W. W. Rossiter
Feed cutter F. Hamachek
Feed water heater J. E. Lewis
Feed water heater S. W. Simpson
Feed water regulator J. B. Perkins
Fence post V. E. Randall
Fence post M. C. Wix
Fence post H. J. Donahoe
Fence weaving machine. Wire A. E. Blashill
Fence. Wire W. B. Hughes
Fire alarm T. F. Litaker
Fireproof building construction G. A. Turnbull
Fish line reel E. D. Rockwell
Fluids. Apparatus for regulating the flow of J. J. Royle
Fluids or solid materials. Apparatus for oper-
ating on finely divided J. Lubne
Folding table W. R. Montgomery
Food products. Apparatus for preparing cereal J. H. Miller
Foods. Apparatus for retaining heat in E. C. Kirk
Fruit or berry box J. E. Lynam
Fruit or vegetable eye extractor R. Patterson

Fruits. Treating C. R. Wilson
Furnace S. C. Davidson
Furnace O. Wundrack
Furnace A. H. Mylin et al
Furnace ash chute F. J. Blum
Furnaces. Means for operating hydrocarbon
burners for metallurgical H. W. Falk
Furring clip. Metallic D. Ewart
Furring. Wall J. H. Nicholson
Fuse making machine G. Lispenard et al
Game P. D. Bird
Game J. R. Knapp
Game board D. Stanger
Game table T. S. Croxford
Garment supporter J. M. Wheelers
Gas battery J. H. Reid
Gas burner O. D. Cornell
Gas burner attachment E. D. McCall
Gas generator H. C. Hanson
Gas generator. Acetylene W. J. Stinson
Gas generator. Acetylene G. A. Bidwell
Gas generator and burner. Oil J. P. Tirrell
Gas holder J. H. Coke
Gas meter. Dry S. Kozminski
Gas mixer A. M. Gummer
Gear cutting machine W. A. Twining
Glass melting furnace M. M. Maher
Glue and gelatin from bones. Making H. Hilbert
Golf ball T. C. Crawford
Governor. Engine valve 2 pats C. Kuhlwind
Governor. Speed C. Robinson
Grain drill L. E. Roby
Grain screen F. Fredeen
Grate or fireplace. Fire F. J. Bostel
Greenhouse or other glazed structure C. B. Weathered
Grinding or sharpening device I. M. Rose
Grip fastener. Multiple H. A. Meyercord
Guns. Auxiliary barrel for breech loading V. C. Tasker
Hammock stand. Folding G. F. Allen
Harness F. J. Schenk
Harp T. J. Hissem
Harvesting machine divider G. Wilson
Hat trimming machine F. C. Craw
Headlight. Electric W. H. Northall
Heating. Electric 3 pats W. S. Horry
Heating. Electric E. F. Price
Heating furnace. Hot air E. A. Tuttle
Hinge J. W. Skilton
Hinge. Frictional locking P. C. Palmer
Hinge. Spring H. L. Ferris
Hitching post T. C. Butterworth
Hoof pad E. E. Lemon
Horseshoe J. Fisher et al
Horticultural implement E. Haines
Hose F. B. Bosch
Hose coupling F. W. Killen
Hose, rod, or pipe coupling A. W. Huhsmann
Hot air furnace E. A. Tuttle
Household tool H. H. Tyrrell
Hydraulic jack F. H. Stillman
Index. Ledger G. C. Shepherd
Indexing card holder H. Scudder
Induction coil 3 pats R. Varley
Induction coil vibrator R. Varley
Injector. Steam boiler T. J. Sweeny
Insulator J. W. Osborne
Iron pyrites for desulfurization. Preparing U. Wedge
Jar fastener S. A. Roden
Knitting machine needle S. Woodward
Lace fastener F. E. Stoke
Lacing device E. T. Dixon, Sr
Lacing loop 2 pats G. W. Prentice
Ladder. Step P. Herder, Jr
Lamp burner. Coal oil H. J. Pawling
Lamp. Electric arc R. Hopfelt
Lamp. Electric arc F. Sindingschristensen
Lamp. Vapor I. W. Percival
Lamp. Vapor E. Seitz
Land roller R. V. Wallace
Latch O. F. Immell
Lathe taper attachment. Turret C. G. Richardson
Letter box H. H. Warner
Line holder C. Lykke
Linotype machine S. J. Briden
Linotype machine D. D. Scott
Liquid dispensing apparatus C. A. Gildemeyer
Liquid dispensing apparatus W. B. Cochrane
Lister C. R. Davis
Loading apparatus for tramways H. M. Sackett
Lock S. Wisniewski
Lock L. A. Frank
Lock and latch H. G. Voigt
Locomotive fire door G. S. Edmonds
Loom picker motion D. D. Miller
Looms. Spooler for moquette or other pile
fabric J. F. Walker
Luggage carrier F. Dales
Mail box N. H. Sturgis et al
Mail delivery system. Rural W. A. Sumner et al
Mandrel. Pipe W. Alderdice
Mantle support W. P. Johnson
Match machine M. A. Sheldon
Measuring apparatus C. R. Hudson
Measuring instrument. Prepayment electrical F. Conrad
Mechanical movement D. W. Shiek
Metal bar cutting apparatus V. E. Edwards
Metal sheets. Machine for separating G. Grove
Metal sheets. Separating G. Grove
Milk vat G. H. Simon
Miter box C. A. Anderson
Motor J. T. McGrath
Mowing machine cutting apparatus J. H. Wiekamp
Multicylinder expansion engine C. J. Williams
Music controller roll A. Anderson
Music leaf turner C. Thoma, Jr
Nail blank feeding and sorting machine E. E. Pierce et al
Nasal shield T. Carence
Necktie securing device F. Ferguson
Nut. Axle C. Schneider, Sr
Nut lock J. W. Hancock
Nut lock W. Rundle

Nut. Lock R. Varley
Nut wrench W. E. Gilliland
Odor proof bag W. P. Flowers
Ore concentrator. Centrifugal E. R. Week
Ornamental fabric A. S. Waitzfelder
Packed joint F. B. Clark
Packing box M. O. Anthony
Packing. Rod C. W. Caldwell
Pad or tree protector G. E. Brown
Pamphlet folding and wrapping apparatus S. Elliott
Paper clip or holder W. Lukes
Paper feeding device T. G. & J. B. McGirr
Peeler. Fruit or vegetable 2 pats T. M. Guest
Pen T. M. Guest
Pen. Fountain A. Hart
Pen. Fountain W. R. Rothwell
Pen. Fountain M. R. Crossman
Pen. Fountain F. M. Kegrize
Phase angle adjusting means E. M. Tingley
Phase angle adjustment 2 pats E. M. Tingley
Phase regulation E. M. Tingley
Phonographs, &c. Apparatus for casting cyl-
inders for A. Hamon
Photographic printing apparatus H. C. White et al
Photographs. Rocket apparatus for taking A. Maul
Photoprints, &c. Apparatus for removing
surplus moisture from J. Halden
Physician's examining and treating couch or
table C. C. Hazard
Piano action. Upright F. Hammerle
Piano actions. Pianissimo device for grand A. T. Strauch
Piano. Mechanical P. Pomero
Piano player's key striker J. Courville
Picture projecting apparatus. Slide feeding
device for W. M. Green et al
Pile driver J. H. Hopkins
Pile driving apparatus H. W. Phillips
Pin lock 2 pats W. H. Taylor
Pin retainer J. Evans
Pin tumbler lock W. H. Taylor
Pin tumbler lock key W. H. Taylor
Pipe and nut wrench. Combined G. E. Carnes
Pipe coupling. Automatic C. O. Cole
Pipe or bar cutter W. T. Snell
Planer E. Rawson
Planter and fertilizer distributor. Seed J. D. Kinney
Plaster of paris. Manufacture of W. Brothers
Plate box H. D. & R. C. Bickford
Plover F. Dinwiddie
Plover O. C. Babcock
Plover F. Wienke
Plover and planter. Lister 2 pats C. R. Davis
Plover and planter. Sulky lister C. R. Davis
Plover. Sulky C. R. Davis
Plover. Sulky lister C. R. Davis
Pocket L. M. Brown
Pocket book O. A. Lehman
Polishing machine D. McCance
Power and motion. Mechanism for transmit-
ting and controlling W. H. Kessler
Power transmitter J. Coates
Press G. B. Rowe
Pressure. Controlling device for maintaining
steady T. P. Ford
Pressure regulator B. Zindel
Printing press F. J. Herdle
Printing press D. H. Saunders
Printing press. Platen J. Helm
Printing rollers. Means for securing impres-
sion surface to F. J. Herdle
Protractor and its accompaniments J. H. Renshaw
Pulley driving mechanism I. J. Daily
Pulp beating engine J. White
Pulverizing machine A. Schoellhorn et al
Pump. Ship C. H. Sanborn et al
Pumping apparatus. Oil C. Robinson
Push button switch W. A. Church
Rail joint M. Loppich
Rail joint M. Warner
Railway chair F. W. Pool
Railway. Electric G. H. Fretts
Railway rail stay E. Laas et al
Railway signaling. Electric S. M. Young
Railway trains at danger signals. Means for
stopping W. L. Adamson
Railway wagon J. T. Jepson
Railways. Means for cleaning the third rails
of electrical W. Chausse
Rake O. M. Walker
Ratchet wrench G. Brauer
Razor J. Guinan
Razor guard J. Guinan
Reducing mill H. W. Becht
Refractory material. Basic A. T. Macfarlane
Refrigerator R. R. Graf
Refrigerator car air agitator H. A. Turner
Reins. Driving G. H. Carlin
Resawing machine T. J. Mitchell
Rheostat I. E. Storey
Rheostat. Electric R. W. Brown
Rocking chair with air apparatus M. Friedland
Roller coaster G. A. McLaughlin
Rolling machine. Wheel F. P. Bates
Rotary engine A. Guindon
Rotary engine J. S. Davis
Rulers. Manufacture of H. E. Peucker
Safety pin F. Westpfal
Sail. Spinnaker G. A. Lowry
Sale recorder D. Griffith
Sand box gage T. E. Mooney
Sash lock D. Wilde
Saw cover W. C. Happe
Saw filling machine N. Kall
Saw. Portable crosscut F. Richter
Saw tooth for metal saws. Insertible C. C. Newton
Sawing logs, &c. Electrically driven machine
for K. Kottmann
Sawing machine J. A. House
Sculptor's copying machine R. T. Paine
Seal lock J. D. C. Knapp
Sealing envelopes and mailable matter and
affixing stamps thereto. Machine for J. N. Stacy
Secondary battery L. H. Flanders
Seedbox R. Bassett

Semaphore, Electric..... D. Boisvert
Sewing machine, Corset..... S. Royle
Sewing machine illuminator..... P. Englund
Sewing machine motor..... J. H. Macdon, Jr
Sewing machine rotary fan attachment.....
Sewing machine shuttle actuating mechanism..... H. W. C. von Castens
Sewing machine thread-cutting device..... G. L. Corcoran
Shaft coupling..... J. T. Hogan
Shaft fastener..... J. R. George
Shaft support and antirattler, Combined..... W. A. Jones
Sharpening attachment for band cutters and feeders..... J. C. Bridgman
Shearing tool..... J. Manderson
Sheet cutting machine..... S. Arce
Sheet mill adjusting mechanism..... M. Meriam
Shoe, Ankle supporting..... S. B. Ely et al
Shoe, Electric sole..... G. Krieger
Shovels Making..... A. Reed
Shredding machine or the like M. F. Williams
Sifter, Ash..... J. P. Hill
Signal apparatus..... J. D. Price
Sink overflow device..... E. C. Akers et al
Sizing..... A. Muller-Jacobs
Skirt and waist holder, Combined..... M. Little-Pritzkow
Skirt supporter..... A. M. Ott
Slotting machine..... M. & H. E. Morton
Smoke conveyer..... W. L. Gale
Smokers' articles, Mouthpiece or stem for..... J. A. Manahan
Soap holder..... J. S. Roake
Soldering iron, Electrically heated.....
Spinning ring..... A. C. McCloskey
Spirometer..... H. B. Hoyle
Spring controller, Coil..... A. E. Wells
Stacker, Hay..... T. A. Shea
Starch by centrifugal action Separating..... J. W. Kenworthy
Stay bolt..... R. Schrader
Steam engine..... D. L. Shaffer
Steam engine..... L. Goos, Jr
Steam generator..... F. P. Hummel
Steam generator..... J. G. A. Kitchen et al
Steam generator..... G. L. Rose
Steam trap, Automatic..... J. M. Towne
Steel, Treating and manufacturing.....
Stenciling..... W. B. Burrow
Stone, Manufacturing..... C. L. Burdick et al
Storage battery..... J. C. McClellan
Stove, Camp..... A. V. Meserole
Stove, Heating..... D. L. Miller
Stove for heating smoothing irons, &c..... W. Haegemann
Stove igniter, Oil..... W. H. Wilder
Stove or furnace, Heating..... R. W. Dodge
Strip delivering apparatus..... A. J. Blackford
Sulky..... G. W. St. Clair
Superheater..... J. P. Sneddon
Suspenders and belt, Combined..... S. L. Engel
Swingletree or doubletree..... E. Haiman
Syringe..... H. M. Guild
Table leg attachment..... J. F. Arnold
Tack claw..... G. C. Parish
Tally device..... L. L. Frost
Tap, Bottle..... E. Walker
Telegraph switchboard spring jack..... J. F. Skirrow
Telegraph system..... 2 pats..... H. O. Rugh
Telegraph system, Wireless..... G. Marconi
Telegraphy..... H. O. Rugh
Telegraphy, Apparatus employed in wireless..... J. A. Fleming
Telegraphy, Device for wireless..... J. A. Fleming
Telegraphy, Multiplex..... J. J. Ghegan
Telephone apparatus, Electrical..... P. H. Fisk
Telephone desk set..... H. P. Clausen
Telephone transmitter..... W. L. Wilhelm
Telephony..... A. Meinema
Tent cottage..... A. M. Holmes
Thermal cut out..... H. P. Clausen
Threshing machine..... 2 pats..... M. Setter
Ticket issuing machine..... F. Fredeen
Tie plate..... J. M. Siebler
Tiling substitute..... W. S. Jones
Tire filler, Vehicle..... E. Reizenstein
Tire protector..... C. D. Nirdlinger
Tire tightener..... J. L. Brown
Tire, Vehicle..... C. T. Umsted
Toilet table and traveling trunk combined..... A. C. Hills
Tool, Lady's..... A. L. Jacob
Tool, Great speed alarm..... G. Rouaix
Tool hanger..... E. B. Wiles
Tool, Pneumatic..... W. T. Sears
Top roll saddle..... E. Dixon
Toy..... J. J. Quinlan
Toy, Mechanical..... L. D. Patten et al
Traction engine..... F. C. Watson
Traveling case..... W. T. Richards
Trench digger..... J. Helm
Tripod, Folding..... R. P. Palmer
Trolley..... C. E. Smith
Trolley base..... F. S. Martin
Trolley pole safety device P. McCullough et al
Truck for rolling stock, Bogie..... H. A. Hoy
Truck frames, Device for lifting railway..... W. Schott
Truck, Lateral motion car..... E. C. Washburn
Trucks, Adjustable hook for hand..... G. M. Vickers, Jr
Trunk..... J. A. H. Villmow
Tube bending machine..... G. F. Atwood
Tug, Thill..... G. F. Atwood
Type writing machine..... J. S. Bean
Type writing machine..... W. J. Barron
Type writing machine..... R. W. Uhlig
Universal joint..... E. J. Reece
Valve..... E. P. Allen
Valve, Faucet..... F. F. Field
Valve, Flush..... E. A. Marsh
Valve for safety train stops, Air..... H. G. Sedgwick
Valve gear, Explosive engine..... L. T. & C. Hagan
Valve mechanism..... H. R. Mason
Valve, Reducing..... J. J. Burke
Valve, Throttle..... R. A. McKee
Vehicle body hanger..... H. Jones
Vehicle brake..... H. P. Maxim
Vehicle lamp holder attachment..... A. Groff

Vehicle running gear..... C. P. Malcolm
Vehicle running gear, Motor..... H. P. Maxim
Vehicle, Steam propelled..... H. K. Hess
Vehicle wheel..... J. A. Polk
Vending apparatus..... R. E. Payne
Vending machine..... D. O. Coleman et al
Vending machine..... F. G. Hartell
Ventilator..... S. H. Jacobson
Ventilator..... C. A. Withers
Vessels, Apparatus for scraping ore from wings of..... M. Andrews
Vessels, Self grip and draw off attachment for..... L. E. Saunders
Vise..... H. S. Haunstein
Wagon brake..... N. Pfeffer
Wagon spring..... C. L. Thomas
Walking stick and stool, Combination..... N. F. Russell
Warping machine..... F. Ott
Washing machine..... J. W. Montgomery
Washing machine..... C. Dietz
Water, Apparatus for separating oil and grease from..... E. Friesdorf
Water closet tank valves, Mechanism for operating..... P. J. Gross
Water heater..... E. E. Murphy
Wave responsive device A. E. Woodward et al
Wax applying roll or brush..... W. A. Reed
Weeder, Wheel..... C. Wear
Welding steel plates, &c., to sheets of aluminum and aluminium plated other metals..... H. Wachwitz
Wheel traction band..... L. Kniffen
Wheel tread, Traction..... J. W. Pridmore
Wind motor..... J. I. Williams
Winding or hoisting drum..... H. F. James
Windlass..... G. W. Menefee
Window..... J. Frye
Window screen..... G. H. Stout et al
Widow screen, Extension..... G. W. Rockwell
Wire drawing machine..... D. J. McMahon
Wire stretcher..... P. O. Daughters
Wrench..... G. A. Andrus
Wrench..... E. Howell
Wrench..... J. N. Noyer
Wrench..... W. H. W. Beecher
Yoke center, Neck..... J. E. Beebe

DESIGNS.

Bath tub..... C. Weelans
Collar or similar article..... A. Schweriner
Hammock body..... I. E. Palmer
Lavatory..... C. Weelans
Spoons, forks, or similar articles, Handle for..... G. P. Tilton
Stove..... P. H. Ficken
Toy bank..... A. C. Williams

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Adding and recording machine, A. S. Dennis
Adding machine..... T. A. Wheeler
Adjustable protective frame..... A. L. C. Marsh
Air brake train pipe testing device..... W. S. De Camp
Air ship..... D. Greenw et al
Alarm lock..... O. Miller et al
Amusement apparatus..... H. G. Traver et al
Animal trap..... J. B. Harig
Animal trap, Self setting and ever set..... L. H. Simon
Automatic sprinkler..... C. B. Garrett
Automatic supply regulator..... E. H. Gold
Axe box, Car..... J. Spurr
Baling press..... J. J. York
Bank, Savings..... R. J. Thompson
Bath apparatus..... I. R. Hamilton
Beaming mechanism..... H. Van Winkle
Bed bottom..... J. G. Peace
Beehive..... H. Daveness
Belt, Driving..... A. Fritz
Belt loop attachment for garments, Button..... J. D. Burns
Belt or girdle, Extensible..... G. Farrell
Belt shipper for pulleys..... E. Kottusch
Belting and making same..... L. P. Warner
Bench dog..... J. H. Belser
Binder, Temporary..... J. F. Cordes
Boat lowering device, Life..... J. F. Becker
Bolt..... F. P. Pfeiffer
Book, Account..... H. Sixbey
Boring and tapping, Combination tool for..... J. H. Allendorfer et al
Bottle cap..... E. Norton
Bottle, Non refillable..... D. S. Cooke
Bottle, Non refillable..... C. A. Taylor
Bottle, Non refillable..... G. W. Lovejoy
Bottle opener and temporary closure, Capped..... C. Cady
Bottle stopper..... G. Kirkegaard
Bottles, &c., Means for packing..... W. Ducart
Bowling alleys, Machine for use in constructing and repairing..... J. F. Darrell
Box covering machine..... H. B. Blackinton
Box or container for bottled beverages..... P. D. Laible
Braid, Skirt..... J. W. Schloss
Brick for the construction of arches..... S. H. Clarke
Bridge construction..... W. R. Diehl
Brush..... C. Gruneberg
Brush, Sweeping..... G. L. Lamb
Brush, Tooth..... H. E. Sandiford
Bucket dumping device, Automatic..... J. McKinnon
Buckle, Trace..... J. Mensen
Building construction..... G. A. Behrad
Buoy..... S. W. Roberts
Burglar alarm..... A. F. Schilling
Bushing, Bung..... G. H. Ricke
Bushing for crank bearings, Shifting segmental..... L. T. Weiss
Bushing forming and setting machine..... J. Jacobsen
Button, Cuff..... J. Pejchar
Button, Detachable..... A. H. Brownley
Buttonhole cutting and stitching machine..... E. B. Allen
Calipers..... F. Shafer
Can or vessel opening attachment..... S. L. Sheldon
Car air cushion..... M. Downer
Car attachment..... F. Freedreaz
Car bolster..... C. A. Lindstrom
Car brake..... M. Mabrey
Car brake head..... J. H. Graham

Car brake beams, Signal operated by..... S. N. Wilcoxson
Car brake mechanism..... J. Shelton
Car brake slack adjuster..... E. E. Crowell
Car coupling..... A. A. Moss
Car coupling, Automatic..... L. Bottenstein
Car door, Grain..... W. L. Carson
Car door mechanism..... J. F. Streib
Car door mechanism..... C. A. Lindstrom
Car draft rigging, Railway..... W. H. Miner
Car, Dumping..... A. D. Harrison
Car emergency brake, Street..... P. Flood
Car friction gear Motor..... W. Seck
Car heating systems, Train pipe terminal for..... J. F. McElroy
Car loading apparatus..... E. R. Abbey
Cars, Automatic brake coupling for railway or electric..... K. Geucke
Carbonating apparatus, Liquid..... J. F. & D. Youngblood
Carpet stretcher..... W. Reichle
Cart..... H. A. Bienhoff
Cart, Garbage..... R. D. Wirt
Casein composition and procuring same..... W. A. Hall
Celluloid compound..... A. Schmidt
Cement floors or concrete, Bar for strengthening..... J. F. Golding
Centrifugal machine..... J. W. Macfarlane
Chandelier..... E. Witzemann
Child's safety harness..... A. Weiss
Chimney..... P. Dickinson
Chum delivering apparatus..... F. E. Forster
Clamp..... P. Lyden
Clamp..... R. Rossier
Clamp for hoops, hands, &c..... W. P. Rice
Clamp or stop cock for flexible tubes..... O. L. Jerald
Clip..... D. E. Mapother
Clock case..... A. M. Lane
Cloth rolling machine..... C. Krause
Clothes drier..... J. Judelson
Clothing rack..... J. A. Hockersmith
Clutch, Friction..... M. C. Nixon
Coal breaker..... E. S. Decker
Coaling station..... W. Robertson
Coat, Rain..... B. E. Terwilliger
Coat, Storm..... T. A. Jones
Coffee extract, Preparing..... F. J. Reichert
Coil, Radiating condensing..... R. Jardine
Column, Metallic..... E. Ohnstrand
Combustion structure..... G. C. Savage
Commutator brushes, Means for preventing arcing between..... E. Thomson
Compensating device..... W. Y. Cruikshank
Compressing mechanism..... W. M. Holmes
Concentrator..... W. L. & F. S. Card
Concentrator..... L. C. Graupner
Condenser..... O. H. Mueller
Conveyer, Stock house..... T. A. Edison
Core drying oven..... W. J. Breen
Corn husker..... R. N. Thomas
Corset stay..... C. H. Cunningham
Cot or bed, Folding and convertible..... J. W. Jones
Cotton gin mote board..... C. G. Bodungen
Crane..... C. H. Howland-Sherman
Cranes, Track or the like for..... R. Wilke
Cross section tester..... H. E. Smith
Crusher and pulverizer..... M. F. Williams
Cultivator disks, Dust proof journal for..... N. S. Barger
Cultivator wheels, Dust proof journal for..... N. S. Barger
Current collector..... J. E. Greenwood
Current motor, Alternating..... R. McNeill
Curtain fixture..... C. Reiss et al
Curtain holder..... J. D. Ticken
Cut off..... A. Martin
Cut off, Rain water..... J. J. Sandvig
Damper regulator..... E. A. Prah
Dash foot and brace combined..... H. C. Swan
Dental matrix retainer..... W. Crenshaw
Doll, Dancing..... Y. F. Pinnick
Drier..... W. R. Macklin
Driving mechanism..... H. M. Pope
Easel..... H. C. Cady
Elastic fabric..... H. J. Gaisman
Electric conductor ground connection..... F. P. Fuller et al
Electric conductor support..... F. C. Locke
Electric heater..... E. Eckmann
Electric motor..... A. Vanderbeck
Electric switch..... A. R. Fergusson
Electric switch..... J. H. Rusby
Electric time switch..... H. C. Little
Electrical impulses, Transmission of..... 2 pats..... J. S. Richmond
Electromagnet..... H. W. Chamberlain
Elevator safety device..... C. N. Pollock
Ellipsograph..... J. F. Hanlon
Embossing punch..... R. Woodman
Embroidery hoop or ring..... W. N. Howden
Emergency brake..... F. B. Corey
Enameled ware, Manufacture of..... T. M. Luanan
Engine base clamp..... C. P. Shertzer
Engine controlling mechanism, Explosive..... R. Jardine
Engine cylinders, Means for cooling explosive..... F. H. Marsh et al
Envelop opening machine..... A. Hess
Envelops, &c., Safety fastener for..... J. Noseworthy
Excavating shovel..... J. W. Page
Exhibitor, Curtain..... P. Jr. & M. Roush
Explosion engine..... K. J. McMillen et al
Fabrics, Machine for uniting looped..... G. O. & H. E. Harbaugh
Fan, Electric..... A. R. Fergusson
Fanning mill for cleaning grain &c J. L. Doub
Fare register..... H. Tyler
Fastening device..... R. M. Pancoast
Feed water heater..... T. Y. Stewart
Feeder and band cutter..... J. A. Anderson
Feeding device, Mechanical..... T. L. & T. J. Sturtevant
Fence..... G. Bronson
Fence..... I. Haws
Fence brace..... A. W. Whaley
Fence material..... J. Stickley
Fence post..... F. Hedrick
Fence post..... J. B. Goudry
Fencing, Wire..... C. B. Baumgartner
Ferrules, &c., Machine for contracting..... M. C. Schweinert et al
Fertilizer distributor..... J. S. Kemp
Fibers together, Felting or matting..... 2 pats..... G. Goldman
Fibers together, Matting or felting G Goldman

Fibers together, Uniting or matting..... 3 pats..... G. Goldman
Filing cabinet..... H. W. Andrews
Filter..... K. Abraham
Filter..... O. Solg
Fire extinguishing apparatus..... E. W. Hicks
Firearm, Automatic..... T. C. Johnson
Fireproof door..... F. A. Howell
Flask..... H. Struben
Flexible joint..... T. W. Moran
Floor or ceiling..... W. N. Wight
Floors, ceilings, sidings, &c. Tool for removing..... W. O. Harmon
Floors, partitions, &c. Construction of..... V. Moeslein
Flour non hygroscopic, Making..... O. Avedyk
Fluid pressure brake..... J. W. Cloud
Fluids, Air or gas lift for..... W. B. Harris
Flushing tank..... F. Findelsen
Flushing tank..... B. Walker, Jr
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Fulling mill stop motion..... J. P. Ryan
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Fuse, Blow out..... F. B. Corey
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Garment supporter..... F. S. Boedefeld
Gas burner..... C. A. Campbell
Gas burner, Furnace..... N. Cote
Gas burning apparatus..... W. H. Bradley
Gas fireplace heater..... A. B. Schofield
Gas generator, Acetylene..... F. E. Way
Gas machine carbide feed..... J. T. & T. C. Hays
Gas producer..... J. Reuleaux
Gases, Apparatus for the filtration of..... G. C. Stone
Gate..... P. Oppenheim
Gear, Friction..... D. L. Lindquist
Gear, Frictional reversing..... A. Adamson
Gearing, Electromagnetic..... E. M. Bentley
Glass drawing bait..... J. H. Lubbers
Glass drawing bait..... R. S. Pease
Glass gathering machine..... L. Miller
Grading machine, Road..... A. L. Powlison et al
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Grain binder shocking attachment..... J. C. McDougall
Grain germinating apparatus..... V. Lapp
Gramophone reproducer support..... E. R. Johnson
Grapple..... T. Alexander
Grinder, Corn..... M. H. Hatfield
Grinding harvester knives, &c. Machine for..... M. C. Nixon
Gripping device..... F. H. Lamb
Hammer, Power..... H. W. Hathorn
Handle..... E. F. Smith
Harness hook..... B. H. Wilson
Harvester reel..... G. J. Friend et al
Hat, coat, and umbrella rack, Combined..... W. R. Clark
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Hay loader..... E. C. McConville
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Horseshoe..... J. Groening
Horseshoe calks, Machine for making..... J. H. Vinton
Hose connection..... F. H. Paradice
Hose coupling..... G. Stroth
Hose drier..... C. M. Bowman
Hot blast air feeding center tube..... R. A. Culter
Hydrocarbon lighting apparatus..... F. E. Mavrogordato
Igniter mechanism, Sparking..... C. C. & E. A. Riote
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Index..... H. M. Rudasill
Ingot, Compound metal..... R. Rowley
Inkstand..... C. Keller
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Insulating material saturating machine..... G. M. Gest
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Insulator supporting pin, Line..... J. D. Hillard, Jr
Jar closure..... W. B. Fenn
Jewelry mounting..... A. A. Boismaure
Key can..... T. F. Whitmarsh
Knockdown box or crate..... J. F. Reul
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Lamp filaments to leading in wires, Device for securing incandescent..... A. W. W. Miller et al
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Latch..... H. Harden
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Lavatory or shampooing bowl, M. Housholder
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Ledger, Loose leaf..... H. W. Ayres
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Linotype machine attachment..... P. Shea
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Mail box..... A. M. Hoes
Mail chute..... J. W. Cutler
Mail delivery case, Rural..... A. M. Kindwall
Mailing tube closure..... H. Del Mar
Malt turning machine apron..... D. D. Weschler
Massage machine..... J. Graves
Match box holder..... E. A. Parker
Match package..... J. A. E. Criswell
Match safe..... S. Quee
Measure, Line..... S. Kilne
Measuring and cutting off machine R. Thirsk
Mechanical movement..... F. A. Yokom
Metal bars or beams and structural work, Manufacture of flanged..... H. Grey
Metal box, Hermetically sealed..... S. Jacoby

Metals by chemical process. Apparatus for extracting T. B. Joseph
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 Mining machine engine J. B. Heenan
 Mirror L. B. Prahar
 Molding machine F. W. Hall
 Motor J. Vinson
 Mower attachment. Lawn W. G. Johnson
 Mvfler, Exhaust C. E. Yackel
 Musical instrument. Automatically operated H. E. Sharps
 Necktie holder L. Hodecker
 Needle lubricator E. C. Reed
 Negative printing attachment. Gas light G. W. Harse
 Newspaper or periodical S. B. Hutchinson
 Nut lock J. A. Douglas et al
 Oak lock E. F. McIntyre
 Oil burner. Crude C. L. Grundell et al
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 Ophthalmoscope C. McCormick
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 Ore concentrator J. Shier
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 Ores. Treating W. F. Hannes
 Organ wind chest. Pipe T. Clausen
 Packing box J. J. Hinde
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 Pad or tablet cutting machine C. F. Taylor
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 Paper machine A. W. & L. W. Case
 Paper. Photographic developing F. Gunther
 Paper. Producing platina copy A. Lurz
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 Pipe hanger C. MacTaggart
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 Pipe joints. Machine for uniting sheet metal J. J. Mulvaney
 Placket closer D. A. Moon
 Planter. Broadcast seed S. B. C. G. & J. C. Abbott
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 Plumbing fixtures. Waste control for E. L. Angell
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 Printing plate R. J. Sachers
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 Printing wheel J. J. A. Jones
 Pulley. Clutch G. A. Medlin
 Pump. Air J. E. Fisher
 Pump cylinder J. H. Miller
 Pumps. Concentric valve for compressor A. Kryszat
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 Rail clamp. Guard P. E. Kelly et al
 Rail clearer H. C. King
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 Railway brake J. H. Graham
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 Railway cross tie E. S. Keefer
 Railway gate. Automatic J. P. Fowler
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 Railway signal. Electric W. S. Jackson
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 Railway tie W. A. Nichols et al
 Railway tie and fastening J. F. Smith
 Railway tie seats. Apparatus for forming W. Goldie
 Railway track W. Goldie
 Railway tracks. Forming W. Goldie
 Railways. Ice cutter for third rail electric S. B. Stewart, Jr
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 Refrigerator car J. S. Bashaw
 Rheostat W. C. Yates
 Riveting machine M. C. Machado
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 Rope or cable grip for haulage purposes J. Aspinall
 Rotary engine M. E. Knight
 Rotary motor J. Nielsen
 Sand blast F. Sticker
 Sanding system W. Schaake
 Sash fastener F. B. Clapp
 Sashes. Antirattling device for window F. Huberti
 Saw clamp and file guide H. W. Merwine
 Sawmill head block shifter J. T. Simpson
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 Screw jack. Trestle H. Edeline
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 Sectional case O. O. Buice
 Seed cleaning machine. Cotton J. Davidson
 Seeding machine. Force feed H. C. Ham
 Self clearing rake J. Morrison, Jr
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 Sewing machine. Button R. L. Lyons

Sewing machine thread holding mechanism J. H. & J. B. Ursbruck
 Sewing machine work clamp. Buttonhole E. B. Allen
 Shade and curtain fixture bracket P. Gallagher
 Shade bracket and curtain rod holder. Combined J. E. Verkleer
 Shade retaining device. Window H. Witte
 Shade roller and curtain pole holder. Combined W. A. Nordling
 Shade roller bracket and curtain pole support. Combined D. J. Cooke
 Shaft carrier or thill tug D. B. Shirk
 Shaft collar C. H. Melius
 Shaving paper holder W. P. Nelson
 Sheet feeder. Pneumatic A. Lagerman
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 Sidewalk E. A. Langenbach
 Sidewalk cleaner T. C. Hiles
 Sign frame C. G. Mixer
 Sign switch mechanism. Electric F. S. Wahl
 Signal receiving apparatus. Alternating current G. W. Pickard
 Signaling and operating system H. C. W. Graham
 Signaling apparatus. Block J. A. Lehr
 Sink bracket J. J. Mahoney
 Skirt supporter and shirt waist holder C. B. Peterson
 Sorting machine E. Rettich et al
 Sound records. Apparatus for electroplating G. K. Cheney
 Speed changing mechanism 2 pats. C. J. Reed
 Speed indicator G. N. Moore et al
 Spinning apparatus. Ring G. Paley
 Spring back chair J. Gilson
 Stacker. Pneumatic straw J. A. Walsh et al
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 Standard A. M. Moylan
 Steam and vapor generator. Electric T. W. Neely
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 Steam generator E. A. Briner
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 Stereoscopic apparatus H. C. Snook
 Stitch separating and indenting machine F. J. Thon et al
 Stock loading device W. Dawson
 Store service apparatus E. R. Gill
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 Stove or furnace J. M. & S. R. Crowner
 Strainer and filter G. A. W. Schilling
 Sugar. Producing milk W. A. Hall
 Suspenders G. W. Scott
 Swing G. P. Armstrong
 Switch H. Trumbull
 Switch operating mechanism J. H. Miller
 Talking machine E. T. Palmer
 Tank heater H. D. Meyer
 Telegraph. Printing C. L. Healy
 Telegraph receiver L. Cerebotani
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 Telephone climber's seat J. E. Bennett
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 Telephone receiver M. R. Hutchison
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 Testing machine W. R. Cock
 Thill coupling C. A. Sager
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 Thread dressing machine G. A. Fredenburgh
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 Tin by electrolysis. Obtaining E. Quintaine
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 Tire inflator F. H. Geisler
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 Tool. Compound A. O. Highsmith
 Tool handle. Pneumatic C. H. Peck
 Top. Spinning F. Ansley
 Towel rack S. A. A. Stenberg
 Toy J. Chein
 Toy A. M. Siebelist
 Toy elevated railway track H. C. Ives
 Toy gun J. B. Mason
 Trace end supporter D. M. Allen
 Track claw A. P. Nichols
 Track gage A. P. Nichols
 Track sanding device W. H. Kilbourn
 Train control system H. E. White
 Traveling case W. D. Chase
 Trestle. Adjustable W. A. Drummond
 Tricycle propelling gear O. Heynsohn
 Trolley head P. D. Hean et al
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 Trolley wheel J. S. Fletcher et al
 Truck bolster center bearing C. T. Westlake
 Truck frame. Railway car C. T. Westlake
 Trunk dowl pin and lift O. Rangnow
 Truss. Adjustable M. O. Halliwell
 Tubes. Mechanism for flanging the ends of A. F. Nordenskjold
 Turbine governing mechanism J. Wilkinson
 Turbine. Reversible C. F. de Kierzkowski-Stewart
 Turn button. Locking G. W. Coulson
 Twist drills. Forming R. L. Barclay
 Type bar construction F. X. Wagner
 Type writer E. Runge
 Type writer C. Wasmuth
 Type writer adding attachment J. W. Magness
 Type writing machine F. W. Hillard
 Type writing machine ribbon feed mechanism E. G. Latta
 Undergarment G. A. Mattern
 Unloading device F. G. Pace
 Vaccine point H. K. Mulford
 Valve J. A. Desmarteau
 Valve. Air brake controlling F. B. Corey
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 Valve gear. Engine 2 pats. O. Jackson
 Valve. Steam engine cut off F. J. Waters
 Vault cover. Illuminating J. T. Harrop
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 Vegetable washer J. F. Fugazzi
 Vehicle. Motor B. C. Hicks
 Vehicle top storm curtain D. C. Lawless
 Vending machine T. M. Day
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Vending machine. Coin-controlled W. T. Drew
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 Vessel handle T. W. Forster
 Vessel rig. Sailing B. W. Collins
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 Washing machine. Clothes R. Loux et al
 Waste paper box. Street G. C. J. Engelland
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 Water softening apparatus H. Breda
 Water tank J. Miller
 Water wheel. Horizontal E. Ortwein
 Wheel rim J. F. W. Rethmeyer
 Wheel wrench J. H. Chappell
 Windmill W. P. Brett
 Window attachment L. K. Bohm
 Wood cutting machine A. A. Bartlett
 Wrench C. G. Molin
 Wrench C. F. Beach
 Wrench W. E. Snediker
 Wrench J. S. Barclay

DESIGNS.

Badge F. C. Fane
 Badge N. M. Kirshner
 Badge or similar article A. Schicklerling
 Range or stove. Cooking C. M. Liphart
 Spoons, forks, or similar articles. Handle for W. C. Codman
 Spoons, forks, or similar articles. Handle for 2 pats. G. P. Ittig
 Spoons, forks, or similar articles. Handle for 2 pats. J. Rothlisberger
 Stock F. Sollee
 Trimming for ladies. underwear T. Kerwin et al

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 Annunciator D. H. Marshall
 Apparel. Wearing A. Siminoff
 Ash pans. Automatic sprinkler for E. M. Thompson
 Automobile C. C. Riote
 Automobile F. A. Gardner
 Automobile steering device F. A. Gardner
 Axle. Dust proof J. L. Freasier
 Backing strip applying machine W. L. Jacobie
 Baling press W. C. Key
 Banding making machine G. Frost, Jr
 Bandoleer G. C. Palmer
 Barrel end finishing mechanism R. A. Lancey et al
 Basin. Foldable J. W. McCann
 Bed riser. Sheet metal J. M. & F. Holland
 Beds. Wire fabric for folding O. R. Hunt
 Bedstead. Foldable C. P. Brown
 Bell. Revolving J. P. McCann
 Bending machine S. L. Budd
 Bicyclist's globe A. Rosenthal
 Binding press W. Stringer
 Binocular. Folding G. Fournier
 Biscuit can C. G. Blicke
 Bit extender W. B. Swan
 Blank. Statement G. W. Downing
 Blanking machine H. L. Bradley
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 Boiler cleaner. Steam C. J. A. Grille
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 Book holder S. H. Law
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 Bottle for the storage and transportation of liquids H. C. Stover
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 Box lid holder C. S. Christianson
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 Bristle combing machine P. Trepanier
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 Camera. Photographic E. Krokne
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 Cap A. Wolfgang
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 Car vestibules, &c. Diaphragm for 2 pats. W. M. Salisbury
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 Carbureter L. C. Snell
 Carbureter. Hydrocarbon engine C. M. Mohler
 Card feeding and positioning device G. W. Donning
 Cardboard creasing machine L. A. Mayall
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 Carving machine. Automatic F. P. Burkhardt
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 Cement can W. W. Hall
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 Chute C. K. Baldwin
 Circuit breaker. Automatic magnetic W. M. Scott
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 Clamping dog C. A. Yost
 Cleaning, oiling, or polishing compound W. B. Tyler
 Clock. Electric H. B. Scott et al
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 Cotton handling apparatus. Seed C. R. Benefield
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 Crusher J. W. Boileau
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 Curtain holding device. Spring actuated 2 pats. F. B. Hopwell
 Curtain pole and shade roller bracket. Combined A. Kerr
 Curtain ring S. J. Tracy
 Curtain rod threader J. J. Monaghan
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 Cutlery renovator H. Hansen
 Cutting machine J. A. Frenzel
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 Dental or surgical chair L. T. Parsons
 Denture. Artificial. O. C. & J. R. Haldeman
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 Detergent compound J. K. Heikes
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 Display and advertising stand. Combined J. K. Patton
 Display device W. J. Pfugrad et al
 Display rack D. S. Campbell
 Door attachment W. M. Taylor et al
 Door check H. W. La Munyon
 Door check. Automatic S. J. Rawlings
 Door or shutter J. Diericks
 Door stop C. W. Miller
 Dovetail cutting machine E. Jackson
 Draft hook. Locking G. M. Atall
 Draft rigging H. T. Krakau et al
 Drafting garment patterns E. J. Curran
 Drilling machine W. Wattie
 Drinking cup. Aseptic J. J. Shea
 Driving mechanism. Friction A. C. Eastwood
 Drying house A. A. Scott
 Dye and making same. Glucoside F. J. Oakes
 Dynamo testing machine J. J. Wood
 Dynamometer. Indicating or recording E. Weston et al
 Ear hood A. E. C. Otte
 Ear ring J. Pejchar
 Egg coating compound W. Sanders
 Electric dynamo R. M. Newbold
 Electric generator. Frictional G. Germakian
 Electric motor controller T. E. Barnum
 Electrical conductor P. A. McGeorge
 Electric inductive conductor P. A. McGeorge
 Electrical distribution system J. S. Peck
 Electrical energy. Accumulating and using A. G. Betts
 Electrical machine brush holder B. G. Lamme
 Electrode for vapor electric apparatus P. C. Hewitt
 Electroheater E. R. Waterman
 Elevator P. F. Foley
 Engine cut off mechanism. Reversing B. C. Ball
 Engine vaporizer. Explosive F. Dickinson
 Engines. Gas generator for explosive F. E. Pfister
 Equalizer or tripletree D. J. Shyne
 Ever. Three-horse J. W. Gamble
 Excavating and sluicing gravel, &c. Apparatus for F. K. Hoover et al
 Excavating machine W. J. Roelofson
 Extension table G. G. Johnson
 Eyeglasses M. Bourquin et al

Fare indicator and protector for street car registers. Auxiliary.....F. Paduveri
Farm gate.....C. T. & J. L. Reams
Feed cutter.....W. Houghton
Feed water heater.....A. J. Sweet
Feed water regulator.....A. W. Rowinsky
Fence locking plate Wire.....W. G. Renaker
Fence or gate. Food.....J. J. Johnson
Fence post.....J. P. Plattenberger
Fence. Wire.....J. S. Martin
Fibrous material. Feeding mechanism for machines for treating.....W. A. & A. M. Shely
Fibrous material. Machine for breaking and cleaning.....W. A. & A. M. Shely
Fibrous material. Machine for breaking and scutching.....W. A. & A. M. Shely
Field winding support.....B. A. Behrend
Fifth wheel.....J. S. Barrette
Floor and building same.....W. N. Wight et al
Flour into barrels or sacks. Machine for packing.....L. Van Nette
Flower pot.....F. A. Muller
Fluids. Air or gas lift for.....W. B. Harris
Folding box.....reissue.....Z. B. Webb
Folding machine.....R. C. Seymour
Folding machine. Material.....R. B. Friend
Fumes. Device for distributing noxious.....L. M. Beckes
Furnace.....J. Murphy
Furnace door. Reversible.....I. R. Davis
Furnace draft controlling mechanism. Steam boiler.....J. E. Gerould
Furnaces. Hot blast apparatus for metal-lurgical.....A. P. Gaines
Furnaces, &c. Joint for brickwork of.....F. C. Roberts
Furniture. Combination.....K. A. Ruehlin
Fuse block.....J. A. Heany
Fuse or cut out. Electric safety.....J. A. Heany
Gage glass protector.....T. Mirk
Game apparatus.....A. G. P. Ebert
Game apparatus.....J. A. McKenzie
Garment supporter loop.....J. H. Pilkington
Gas. Apparatus for manufacturing carbureted water.....W. R. Addicks
Gas engine.....F. A. Gardner
Gas engine. Balanced valveless two-cycle.....R. P. Thompson et al
Gas producer. Water seal.....W. H. Holcroft
Gas retort closure.....S. B. Russell
Gases. Apparatus for the treatment of.....H. Pauling
Gaseous mediums from air. Apparatus for generating.....J. N. Alsop
Gaseous mediums from air. Generating.....J. N. Alsop
Gate.....J. Schepelerle
Gear and clutch mechanism. Reversing.....H. J. Mohlenhoff
Gear. Change speed.....T. Gries
Gear for motor-driven lathes or other tools. Variable speed.....L. H. Johnson, Jr
Gearing. Variable transmission.....B. M. Coffee
Glass articles. Apparatus for drawing.....J. H. Lubbers
Glass drawing machine.....H. Crimmel
Glassware annealing leer.....C. A. Dunbar
Glove.....W. Lefi
Grinding machine.....C. Kehr
Grinding machine for railway handcars Tool.....J. Grassmann
Grinding or polishing machine.....C. F. & C. H. J. Dill
Guitar attachment.....L. P. Halladay
Hair retainer.....W. S. Bechtold
Hammer.....G. H. Rowe
Hammer nail holding attachment.....E. H. Platner
Hand. Artificial.....E. T. Forrester
Harness draft attachment.....J. Bloedel
Harvester. Beet.....J. B. Struble
Harvester. Corn.....G. W. Culp
Hat and hat shield.....W. J. Anderson
Hay loader.....H. A. Adams
Hay loader and raker.....A. Rowan
Headlight.....W. F. Walsh
Hinge gage.....B. Fraizer
Hod.....J. White
Hoisting apparatus.....H. D. Stratton
Hoop.....J. P. Chaplin
Hopper.....N. F. Palmer
Horse releaser.....G. H. Slattery
Hose coupling.....T. F. Downing
Hose coupling.....G. B. M. Buzzell
Hose coupling.....W. Liebl
Hydrocarbon engine. Multiple cylinder.....E. L. Russell
Ice cream freezer.....A. Stern et al
Ice cream freezer.....H. J. Gerner
Ice cutting machine.....J. H. Gibson
Ice hook.....T. J. Ball
Illuminating structure.....F. L. O. Wadsworth
Index and display device. Exhibitional.....C. Heller
Inhaler.....G. L. Bennett
Inhaler and respirator.....J. W. Swindell
Injector. Steam.....J. Desmond
Inking pad.....H. Baumgarten
Insect destroyer.....H. Baesley et al
Insect trap.....J. W. Sheaffer
Insecticide. Device for mixing and applying.....W. H. Brown et al
Insecticide. Making an.....P. Bachmann
Insulator. Tubular.....F. M. Locke
Iron sand into briquets or lumps. Converting.....T. Rouse
Jar closure.....H. S. Brewington
Jar closure.....W. B. Fenn
Jewelry.....J. Pejchar
Joint.....W. N. Barrett
Keyboard. Transposing.....J. H. Kohlmoos, Jr
Knitting machine.....G. W. Ruth
Knitting machine. Straight.....G. A. Landenberger
Knob attachment.....S. Fader
Lacing hook.....J. V. Washburne
Ladder.....J. A. Jaeger-Rainer
Ladder. Step.....A. Hartzler
Lamp.....H. F. Smith
Lamp chimney or globe.....L. F. Bergman
Lamp. Electric.....A. J. Wurtz et al
Lamp. Electric arc.....T. Hamilton-Adams
Lamp globe or shade. Mica.....A. P. Storrs
Lamp governor. Vapor.....H. F. Smith
Lamps. Fluid pressure regulator or governor for vapor.....H. F. Smith
Land roller and pulverizer.....F. Schinbeckler
Lap ring.....F. Wenke
Latch.....J. P. Owens
Lathe.....P. J. & R. H. Cahill

Lathe. Engine.....E. Earle
Leaching apparatus.....G. W. Stead
Lead bearing ores. Treating.....C. H. Rider
Ledger.....J. A. Kramer
Ledger binder.....L. E. Schoch
Lifting apparatus.....D. W. Parker et al
Lifting jack.....D. Donald
Lightning arrester.....L. R. Gaw
Linoleum. Machine for the manufacture of inlaid.....H. V. Holland
Liquid separator. Centrifugal T. H. Springer
Lock.....A. Meyers
Lock.....S. W. Peregrine
Locking mechanism.....N. B. Stone
Loom. Automatic.....C. A. Brink et al
Loom filling feeder. Automatic.....E. S. Wood
Loom shedding mechanism.....R. G. Pratt
Loom shuttle.....C. E. Sackett
Loom shuttle box.....C. E. Sackett
Looms. Loop cutting mechanism for pile fabric.....G. F. Hutchins
Lubricator.....C. G. Glasrud
Lumber loading device.....A. F. Lucas
Mail crane.....A. F. Finch
Mantle support.....W. E. Blair
Massage instrument.....J. A. Howell
Match box.....M. Nenmerkel
Match making machinery 2 pats A. B. Calkins
Mathematical instrument case.....G. Schoenener
Mattress.....L. N. Bachand
Mattress coiler. Wire.....W. E. Fisher
Measuring apparatus. Liquid.....J. B. Beam
Measuring box. Drawer.....N. W. Davis
Meat tray. Butcher's.....T. F. Graham
Mechanical movement.....W. Hanson
Mechanical movement.....J. F. Siems
Metal bending machine.....E. P. Holden
Mitering and joining machine.....J. B. Saunders, Jr
Mixer.....J. F. Gandolfo
Moisture proof case or receptacle.....J. S. Peck
Mop and wringer. Combined.....E. Hilker
Motor starter.....W. Baxter, Jr
Mowing machine.....W. M. Platt
Music holder.....J. P. Walter
Music leaf turner.....H. Peyton et al
Music leaf turner.....W. H. Safford, Jr
Musical instrument and note sheet therefor. Self playing.....C. A. Shaffer
Musical instrument valve. Pneumatic.....E. de Kleist
Musical instruments. Bridge and binder for stringed.....C. S. Weber
Musical instruments. Note sheet for self-playing.....C. A. Shaffer
Nitric dioxid and nitric acid. Manufacturing.....G. Pauling
Nose guard.....G. W. Wells
Nut cracker.....C. E. Smith
Nut lock.....W. M. Smith
Oil can.....G. Lund
Ore separator. Magnetic.....W. L. Imlay
Oven. Knockdown.....W. H. Dahman
Package. Knockdown.....J. M. & J. J. Callaway
Packing.....H. T. Evans
Packing box.....F. M. Lum
Packing. Metallic.....A. Meuser et al
Packing stand.....W. G. Bond
Pail protector. Milk.....J. & R. C. Fleming
Paper roll core.....T. Elixman et al
Paring knife.....G. W. McLeod
Peat harvesting machine.....A. Dobson
Pen. Fountain.....G. S. Parker
Pen. Fountain.....J. S. Purdy
Pen point.....C. J. Wilson
Perambulator.....A. T. Shearer
Perforating machine.....R. T. Brooks
Photographic plate and film holder.....L. M. Hanks
Piano action.....R. M. Hutchinson
Piano action pianissimo device.....E. Bornhoeft
Piano construction.....R. W. Gertz
Piano mirror attachment.....M. M. Stahl
Piano tone deflector.....F. G. Rigvins
Pick.....J. Hartshorn
Pictures. Treating.....W. B. Tyler
Pigment and producing it from ferrous liquors.....A. S. Ramage
Pigment applying apparatus.....C. A. Tripp
Pile.....G. W. Jackson et al
Pile. Protected.....C. W. Kennon
Pine needles. Treating.....C. M. & O. C. Terrell
Pipe collar or ring.....J. Strand
Pipe sealing cap. Soil.....W. E. Delehanty
Pipes. Combined fitting for soil and vent.....E. G. Watrous
Plane.....A. F. Schade
Plane.....H. M. Wood
Planter, plow, &c. attachment.....S. Iler
Plaster. Treating wood fiber for use in.....M. E. Loose
Plastic material. Machine for molding.....M. Kammerer
Playing ball.....F. H. Richards
Plow.....W. Fletcher
Plow.....T. J. Hubbell
Plow attachment.....E. M. Landis
Pole changer.....R. M. Newbold
Pole check device. Vehicle.....G. A. Lambert
Post and base therefor.....A. D. Benham
Potatoes. Desiccating.....T. Lackovic
Power mechanism.....F. A. Gardner
Power transmitter.....G. M. Eames
Printing machine.....G. F. Read
Printing machine. Coin controlled A. J. Briggs
Printing machine tripping mechanism.....G. F. Read
Printing press.....M. Schmidt et al
Printing press dropping sheet delivery mechanism.....R. Miehl
Printing surfaces. Producing.....O. Dodge
Propelling mechanism. Boat.....B. J. Lavign
Pulley. Expansion.....R. Temple
Pump.....P. H. Dies
Pump.....P. M. Wing
Pump. Condensing air.....J. Wilhelm
Pump. Liquid fuel.....O. J. Root
Rack or holder.....A. M. Schiele
Radiator air valve.....T. Wheatley
Rail joint.....Z. E. Fiveash
Rail joint connection.....M. N. Webber
Railway bumper.....G. H. Kimball
Railway crossing.....H. E. Green
Railway frog and switch foot guard.....P. F. De Boy
Railway rail. Compound three part.....W. J. Holman
Railway rail. Continuous.....M. J. Cunningham
Railway rail stay.....E. Laas et al
Railway safety device. Electric.....G. Gibbs
Railway signal.....E. F. Ryman et al

Railway switch.....H. B. Kleinhaus et al
Railway switch point and operating means therefor. Electric.....A. J. Backer
Railway tie.....F. A. Delano et al
Railway tie.....J. Murphy
Railway tie.....F. M. Hiett
Railway tie.....S. Hartenstein
Railway tie. Concrete. 2 pats.....L. & M. J. Beezer
Railway tie. Metal.....J. Mallat
Railways. Guard covering for third rails of electric.....J. Kress
Range oven.....G. Ott
Razor stropping machine.....A. W. Scheuber
Reaper, mower, &c.....H. T. Harper
Recording device. Electrical.....J. H. Johnson
Refrigerator.....C. Shambo
Renovator. Pneumatic.....J. S. Thurman
Rice. Hulling.....R. E. Kimball
Rice hulling apparatus.....R. E. Kimball
Roller coaster carriage.....O. R. Whittemore
Rubber products. Apparatus for preparing, handling, and vulcanizing tires or other.....2 pats.....E. C. Shaw
Ruler. Rolling.....R. H. Swinerton
Sander or smoothing machine.....G. H. Ober
Sash fastener.....R. Baxter
Sash lock.....A. J. McGehee
Sash stop and lock.....W. Emond
Saw guide. Band.....J. W. Culpepper
Scale. Charging.....R. W. Romig
Scale removing device.....L. Strasser
Scales. Relieving gear for portable weighing.....F. W. Taylor
Scouring board.....J. Adams
Scraper. Feed lot.....W. T. McBride
Screw cutting implement.....H. B. Keiper
Scrubber and mop. Combined.....J. A. Zerbe
Scrubbing machine.....E. J. Stewart
Seal.....F. W. Brooks
Sealing machine. Envelop.....L. Madas
Separator sieve.....W. C. Black
Scrum storing and administering device.....W. S. Apple et al
Sewing machine shuttle.....H. A. Dodge
Shade machine. Window.....M. F. Miller
Shaft. Collapsible.....F. Meisel
Sharpener. Drill.....D. G. Morgan
Sheet conveying machine.....3 pats.....T. C. Dexter
Ship lift.....J. A. Sauer
Shoe fastener.....W. I. Shorten
Shredding machine feeder.....C. E. Curtiss
Signal system. Electric.....G. L. Vannais
Signaling apparatus. Wireless.....L. D. Forest
Signaling on electric traction systems.....T. H. Jones
Signaling system.....J. Weatherby, Jr
Singeing machine.....M. Sarfert
Sliding gate.....B. H. Bennetts et al
Sliding gate.....J. L. Laurence
Smoke consumer and fuel economizer.....J. B. Barrett et al
Soldering machine. Can.....J. J. Griffin
Sole and heel protector. Shoe.....G. C. Calentine
Spectacle holder.....G. L. Eason
Speed indicator. Magnetic.....S. B. Storer
Spinning apparatus. Yarn.....J. Hayden, Jr
Spinning frame thread board.....J. E. Prest
Spinning machine. Mule.....J. Holt
Sprinkling attachment. Wagon.....F. E. Allen
Stacker. Straw.....G. W. Culp
Stamp. Printing.....J. Miller
Stay strips. Forming.....M. D. Knowlton et al
Steam engine.....H. J. Hays
Steam generator for hydrocarbon burners.....G. W. Arper
Steam trap.....H. J. Wessinger
Steam trap.....C. Gulland
Steam trap.....J. D. Walsh
Stock guide.....A. C. Jones
Stocking.....R. Meyer
Storage battery.....W. J. Redmond
Storage battery.....J. T. Niblett
Storage battery.....V. G. Apple
Storage battery. Electric.....A. G. Betts
Straw cutter.....D. A. & J. F. Stewart
Stud. Garment supporting.....B. F. Orewiler
Sulfuric anhydrid. Making.....G. Lunge et al
Superheater.....A. C. Bethune
Surgical operating cushion.....A. C. Eggers et al
Switching head coupling.....W. E. Coffin
Switching mechanism.....reissue.....G. L. Mansfield
Syringe. Portable.....J. Haigh
Syringe. Vaginal.....C. W. Meinecke
Talking machine.....2 pats.....L. P. Valiquet
Tea kettle.....G. T. Schults
Telegraph. Automatic fire and burglar alarm.....R. G. Callum
Telegraph. Printing.....J. C. Barclay
Telegraphy. Wireless.....J. F. King
Telephone line apparatus.....C. E. Scribner et al
Telephone receiver.....E. H. Strauss
Telephone receiver.....J. I. Gemmill
Telephone system.....W. Dean
Telephone transmitter.....J. I. Gemmill
Temperature of a distant point. Electric system for indicating the.....R. G. Callum
Tent.....F. H. Gotsche
Testing device.....O. A. Trowbridge
Thill or draft pole coupling.....H. Turner
Thill shifting device.....G. L. Lawrence et al
Ticket. Coupon.....O. B. Stanton
Ticket rack.....H. W. Thompson
Time recorder. Watchman's.....C. T. Hawley
Tire and carriage bolt holder and clamp. Combined.....C. P. Wing
Tire armor. Pneumatic.....J. W. Aylsworth
Tire. Vehicle.....J. H. Scholding
Tires of bicycles, &c. Means for removing rubber.....S. Nicolson
Tires, &c., on wheels. Means for setting.....T. Gare
Titanous compound and making same.....H. Spence
Tobacco hoisting apparatus.....C. E. Pope
Tobacco leaves. Machine for the treatment of.....G. A. Marier
Tool. Compound.....J. J. McGrath
Tool handle.....M. D. Converse
Tool holder.....C. A. Edlund
Tower for recreation or other purposes.....J. W. Graydon
Toy protector.....G. E. Mellen
Traction engine.....G. M. Dickson
Traction engine.....W. R. Jones
Transom lift.....B. Phelps
Trip mechanism.....W. Spackhaver
Trolley. Electric railway.....D. M. Shaler

Truck bolster. Railway car.....C. F. Street
Truck. Railway.....W. E. Ludlow
Twine cutter.....M. Forst
Type writer platen shift.....B. Alexander
Type writing machine.....R. C. Stickney
Type writing machine.....E. G. Latta
Umbrella tip cap and catch therefor.....E. S. Ross
Undergarment.....R. M. Appleton
Underwaist.....W. W. Bewick
Urinal.....D. Craig
Valve actuating mechanism. Mowing engine.....G. B. Peische
Valve. Circulating.....J. Collis
Valve gear. Gas engine.....F. Dickinson
Valve. Steam engine reversing.....J. Nielsen
Vapor burner.....H. F. Smith
Vegetable boiler or steamer.....G. H. & M. A. Lawrence
Vehicle bodies. Means for connecting running gears to.....W. H. Wansbrough
Vehicle. Motor.....W. O. Shadbolt et al
Vehicle seat covers. Lock for motor G. W. Kerr
Vehicle top support.....B. K. Hendricks
Vehicle wheel.....W. E. Mitchell
Vehicle wheel.....C. Rondell
Vehicle wheel.....W. C. Oswald
Vending machine.....G. G. Stroop
Ventilator.....C. P. Tanner
Vessels. Adjustable level and slanting supporting base for.....L. B. Sherwood
Vise.....W. T. Holland
Vise Bench.....J. Degelleke
Vise jaw liner.....J. A. Hermann
Vise mount.....E. E. Remsburg
Voting machine.....A. Sjoberg
Vulcanizer door locking device.....E. C. Shaw
Vulcanizing press. Compound hydraulic.....E. C. Shaw
Vulcanizing press. Horizontal.....E. C. Shaw
Vulcanizing press. Vertical.....E. C. Shaw
Wagon body bracket.....P. V. Becker
Wagon. Dumping.....O. B. Reynolds
Wagon or cart. Push.....D. J. Barry
Wagon or like coupling.....A. Koppel
Wagon running gear.....J. Gear
Washboiler.....A. W. Snyder et al
Watchcase bezel.....G. E. Hart
Water heater. Portable.....E. H. Schwartz
Water heating apparatus.....F. A. Gale
Weather strip.....E. Douden et al
Welding tool.....F. F. Thul
Wheelbarrow frame.....G. C. Cone
Whist tallying sheet.....E. Bach
Wire stretcher.....C. W. Epperson
Wire tightener.....C. A. Willmarth
Wire working machinery.....J. C. Tweed
Wire working tool.....J. W. Dodd
Work bench attachment.....W. J. Connell
Zither.....G. Almcrautz et al

DESIGNS.

Badge or similar article.....S. Anderson
Lavatory.....C. Weelans
Medallion or similar article.....A. J. Balish
Paper weight.....E. D. Conklin
Picture frame.....H. L. Ashton
Plaque.....F. W. Dieterich
Smoker's set.....J. M. Huffer
Spoons, forks, or similar articles. Handle for.....J. E. Straker, Jr
Spoons, forks, or similar articles. Handle for.....E. Crees et al
Tiling for floor and wall coverings.....A. W. Nilsson
Trimming for ladies' underwear.....T. Kerwin et al
Type. Font of.....I. Kimball

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Addressing machine.....J. S. Duncan
Adjustable spring.....J. M. Ericson et al
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Air brakes. Automatic train pipe coupling for.....R. J. Weken
Air compressor. Tide actuated hydraulic.....W. O. Webber
Alarm system.....F. McGloin
Alloy.....S. Kneppel
Anchor. Mooring.....M. Shepard et al
Anesthetic administering apparatus.....A. G. V. Harcourt
Automatic brake.....S. C. Burson
Axle setter.....G. H. Stant
Axle. Vehicle.....S. C. Drake
Bag machine.....H. E. Westervelt
Bag machine.....H. E. Westervelt
Bale compress.....J. L. Sheppard
Bale tie.....E. Vuncannon
Ball clamp.....W. C. Ladd
Band fastener for cylindrical tanks.....M. M. Ferguson et al
Band fastening.....E. C. Tecktonius
Basin. Wash hand.....F. W. Gordon
Battery.....J. Noble et al
Bed. Combination folding.....J. B. Wheatley
Bed. Metallic folding.....G. A. Mellon
Beds, &c. Spring bottom for.....W. C. Grose
Bedstead attachment clamp.....G. P. Sharp
Bedstead canopy holder.....J. M. Graham
Bevel and square. Combination.....L. & H. Schumacher
Bicycle seat post.....H. Clemons
Binder. Temporary.....W. C. Vanden Berg
Boat launching apparatus.....J. Brauchli
Bodkin.....A. V. J. Ireland
Boiler cleaner. Locomotive.....J. G. Talmage
Boiler tube cleaner.....J. P. Prentice
Boiling hams. Holder for.....H. A. Karlänke
Book mark.....H. C. Fairchild
Bookbinding.....P. W. Ziegler
Bottle capping machine.....R. A. Wittemann
Bottle closure.....J. G. Baker et al
Bottle. Non refillable.....F. D. Christensen
Bottle. Non refillable.....J. B. Fitzgerald
Bottle. Non refillable.....J. A. Edes
Bottle rinsing machine.....J. J. Clifford
Bottle. Water.....R. W. Sampson
Bottle wrapper.....A. Forbes
Box.....H. B. Williams
Box fastener.....F. L. Waldron
Brake beam.....W. McMillan
Brake device.....E. G. Short
Brake shoe.....A. L. Streeter
Briquet binder.....E. J. Hoffman

- Broiler..... P. Dedieu
 Broom winding machine..... W. P. Bliss
 Brush maker's tool..... H. Nielsen
 Brush, Tooth..... J. A. Yates
 Bucket..... R. J. Aspin et al
 Burglar alarm..... A. J. Kercher
 Burglar alarm..... G. A. Sachs
 Burner attachment and shade support, Extensible..... C. T. Fuller
 Burner casing C. H. Montgomery y Agramonte
 Butter cutter..... J. D. Bloom
 Button shank former, Thread..... M. V. Quinn
 Cabinet..... 2 pats..... J. L. Tandy
 Cabinet, Dispensing..... J. Lines
 Cable hanger..... F. E. Wey
 Caisson..... 2 pats..... D. E. Moran
 Calendar..... F. M. Rand
 Can and opener therefor..... E. G. Moersch
 Can capping machine..... C. B. McDonald
 Canned fruits, vegetables, &c. Process kettle for..... J. Baker
 Car..... C. A. Lindstrom et al
 Car coupling..... A. E. Waggoner
 Car coupling machine..... G. W. Bowling
 Car fender..... F. R. Keith
 Car, Freight..... H. S. Hart
 Car, Freight..... O. M. Jones
 Car panel, Convertible..... J. A. Brill
 Car replacer..... L. B. Gump
 Car sander..... B. B. Jenkins
 Car side bearing..... J. E. Norwood
 Car wheel..... H. H. Hayward
 Cars, Check piece or plate for holding the draft rigging to the under sides of..... T. H. Simpson
 Carbureter..... F. C. Merrege
 Carburetor, Hydrocarbon engine..... M. A. Rutenber
 Carding machine..... J. J. Henderson
 Carding machine attachment..... J. T. Griffith
 Carpet renovator, Pneumatic..... A. Lotz
 Cart, Hand..... J. A. Baines
 Casing swage..... F. W. Jones
 Casein, Treatment of..... L. A. Dreyfus
 Cash register..... A. Pfaff
 Cash register..... S. Rhoades
 Casket fastener, Sheet metal..... J. Maxwell
 Casket, Sheet metal..... J. Maxwell
 Caster..... W. A. Tonini
 Caster wheel..... C. E. Myers
 Casting apparatus..... 2 pats..... G. Stroh
 Cement clinker, &c. Apparatus for burning Portland..... T. A. Edison
 Cement, clinker, &c. Burning Portland..... T. A. Edison
 Chair..... H. F. Cook
 Chimney cowl..... B. S. Whitton
 Chromium, Making metallic..... A. K. Eaton
 Cigarette roller..... C. Schopke
 Circuit changer..... C. C. Cadden
 Clock..... R. Korfhage
 Cloth winding machine..... N. Jarvis
 Clothes line..... S. A. Owens
 Clutch, Friction..... W. C. Davis
 Coat collar..... H. Hoffman
 Coating metal objects..... A. Johnston
 Cock and valve, Safety..... D. T. Brown
 Coffee mill..... S. T. Wallace
 Coherer..... A. H. Stewart
 Collar supporter, Lady's..... K. D. Stevenson
 Combs from celluloid, Manufacture of..... C. Bensinger
 Compressing material into form, Attachment for machines for..... H. J. Flood
 Concrete construction, Mold for metal..... C. Weber
 Converters, &c. Apparatus for the introduction of pulverulent substances into..... G. Rosenthal
 Conveying apparatus..... T. S. Miller
 Copper ores, Reduction of..... E. P. Clark
 Corn husking and shredding machine..... W. B. Martindale
 Corn picker and husker..... M. D. Hatch
 Corn shocking mechanism..... J. E. Simmonds
 Corn sorter, Seed..... L. P. Graham
 Corset..... K. Golais
 Corset attachment..... K. H. McFarland
 Cotton gin..... A. McGonagle
 Cotton gin..... R. Starrett
 Cotton press..... C. J. Luce
 Coupling..... T. J. Grier
 Crate..... H. N. Backus
 Crate, Folding..... C. F. Miesen
 Crate, Fruit..... T. P. Reed
 Crushing and grinding mill..... T. L. & T. J. Sturtevant
 Cushion tire wheel..... W. H. Holmes
 Cuspidor..... C. S. Phillips
 Cuspidor lifter..... W. J. Enz
 Cuspidor, Reversible..... F. W. Atwell
 Cut off, Automatic..... E. Hoey
 Cycle stand, Motor..... W. A. McCurd
 Display case..... B. G. Baird
 Display or advertising apparatus..... E. Lundin
 Ditching and grading machine..... H. Henderson
 Door check..... R. A. Lackey
 Door fastener..... C. Coleman et al
 Door lock actuated circuit breaker..... G. G. Knapp
 Doubletree..... A. J. Gray
 Doughnut frier and drainer..... J. Korbel
 Draft equalizer..... G. W. Peter
 Draft gear..... G. W. Thompson
 Drafting instrument..... R. P. Stout
 Dredge attachment..... H. A. Funke
 Dress shield..... I. L. Wild
 Dresser or chiffonier..... A. N. Canberg
 Duplicator..... C. H. Epple
 Dye and making same, Blue azo..... K. Jagerspacher
 Dye and making same, Red basic rhodamin..... A. Bischoer
 Dye and making same, Violet tetrazol..... K. Jedlicka et al
 Dye, Red azo..... P. Julius et al
 Eaves trough forming machine..... I. J. Shifley
 Electric accumulator..... R. Fortun et al
 Electric brake..... W. Lasar
 Electric heater or rheostat..... M. C. Krueger
 Electric meter..... L. D. Decombe
 Electric switch..... H. C. Baer
 Electrical switch..... F. L. Faurote
 Electricity meter..... M. Kallmann
 Electrode, Secondary battery..... C. J. Reed
 Electrolytic apparatus 2 pats..... H. S. Blackmore
 Elevator..... A. Kiddie
 Elevator automatic door lock..... A. B. See
 Elevator door safety catch..... C. F. Stevens
 Elevator shaft safety lock..... H. F. Gurney et al
 Enameling device..... E. L. Dawes
 End post..... C. A. Willmarth
 Engine..... E. T. Ford
 Engine..... A. E. Olney
 Engine vaporizer, Hydrocarbon..... J. J. MacMullin
 Envelop clasp..... S. Dancyger
 Envelop, Mailing..... W. W. Klugh
 Envelop, Safety..... H. B. Schutt
 Evener, Multiple..... C. L. Fowle
 Excavating machine..... D. N. Snyder
 Excavator, Steam dirt..... B. R. Snider
 Exercising machine..... J. Morairty
 Eyelet..... G. H. Brabrook
 Eyesight testing apparatus..... A. & A. C. Bechtold
 Fan system regulation, Pneumatic..... J. L. L. Creveling
 Faucet..... J. J. Delany
 Feed mechanism..... F. H. Lippincott
 Feeder and band cutter..... F. E. Riner et al
 Feeding water to steam boilers, Apparatus for..... T. Brazda
 Fence post..... M. T. Carolan
 Fence post..... J. M. Van Meter
 Fence post..... C. A. Willmarth
 Fender..... J. O. Harrison
 Ferruling shade rollers, Machine for..... C. Flagler
 Filaments films from viscose, Manufacture of..... C. N. Waite
 Filing cabinets, &c. Means for securing movable partitions in..... E. J. Noblett
 Fire escape..... C. G. Wheeland
 Fire resisting curtains, Device for preventing endwise movement and lateral separation of slats in..... W. R. Kinnear
 Fishing tool..... A. H. Brandon
 Fishing tool for sucker rods, &c..... O. A. Mann et al
 Flanging machine..... J. P. Snedden
 Flap layer..... J. B. Hadaway
 Flour Treating..... J. N. Alsop
 Fluids, Air or gas lift for..... W. B. Harris
 Flux, Welding..... W. W. Hout
 Folding bracket..... G. M. Greeley
 Foot, Artificial..... J. F. Rowley
 Fruit gatherer..... H. Mayo
 Fruit jar..... G. H. Ricke
 Fuel, Smokeless..... T. Weepie
 Furniture, Combination article of..... J. H. Griffin
 Game board stand..... E. T. Burrowes
 Game register, Pool..... W. W. Munger et al
 Garbage can..... R. Metz
 Garment fastener..... E. Magaziner
 Garment fastener..... W. L. Dreisbach
 Garment hanger, Locking..... M. Terletzky
 Garment supporter and protector, Combined..... E. Ferneau
 Gas compressor stuffing box G. Braungart, Jr
 Gas condensing bodies, Producing A. Tissier
 Gas generator, Acetylene..... J. McConechy
 Gasometer..... N. Goodyear
 Glass, Blowing..... M. J. Owens
 Glass, Clamp for holding plate..... S. W. Harper
 Glass drawing apparatus..... L. Thornburg
 Glass tank furnace..... P. Ebeling
 Glassware, Manufacturing..... E. Kaye
 Globe or shade holder..... L. R. Hopton
 Go cart..... I. N. Dann
 Go cart Folding..... C. B. Gwathey
 Grading and ditching machine..... T. J. Gray
 Grain drier and cooler..... J. W. Irwin
 Grain riddle..... E. A. Jones
 Grain scourer..... W. B. & H. Allen
 Gramophone or talking machine..... A. Clark
 Grating, Burglar proof..... H. Rick
 Gripper and gripper bar..... H. F. Rubey
 Ground wire attachment..... W. J. Bishop
 Gunner's arm rest..... J. E. Cover
 Hammer..... P. Scholtes
 Hammock..... T. J. Conway
 Harvesters and threshers, Platform attachment for combined..... F. McCown et al
 Hay, &c. Apparatus for unloading J. A. Cross
 Hay rake..... H. R. Ingledue
 Heating systems, Apparatus for measuring heat in hot water..... C. C. Peck
 Heating systems, Funnel cock for hot water..... O. Link
 Heel, Self equalizing..... H. W. Buff
 Hinge, Separable screen, 2 pats..... C. Rowland
 Hog scalding machine..... T. E. Jones
 Horse overshoe..... J. T. Ryan
 Horses running away, Apparatus for preventing..... W. Droste
 Horseshoe attachment..... J. H. Fink et al
 Hose coupling..... M. P. Stevens
 Hose couplings, Dust guard for air T. Gaughan
 Hot air furnace..... P. M. Bruner
 Hot air furnace..... R. H. Sayre
 Hot water heater..... W. Kane
 Hub, Wheel..... W. Sobeys
 Incubator, Infant..... G. H. How
 Index, Card..... W. K. Sparrow
 Insulator heading machine..... T. L. Firestone
 Insulator, Telegraph wire..... C. Hobert
 Iron or steel direct from ore, Producing..... W. M. Brown et al
 Ironing table..... J. M. Ellison
 Jar cover holder, Fruit..... W. T. Wiley
 Jaw wrench..... W. W. Murch
 Key..... G. W. Darling
 Lace fastener..... J. W. Williams
 Lacing..... A. Schoshusen
 Lamp socket switch, Incandescent..... J. D. Raymond
 Lamps, Manufacture of small incandescent..... A. D. Whipple
 Lamps, Means for and method of securing lead in wires in electric..... J. C. Entriken et al
 Last or form, Shoe..... H. B. Walker
 Last spindle socket..... E. S. Morton
 Latch, Gravity..... C. H. Wilson
 Lathe, Ring turning..... W. Christie
 Leaf turner..... W. Geyer
 Level, Spirit..... C. F. Crawford
 Lifting jack..... G. Derksen
 Lightning arrester..... J. C. Barclay
 Lineman supporting mechanism T. E. Hallitt
 Linotype distributor..... J. M. Cooney et al
 Linotype machine..... J. N. Croft
 Liquid drawing apparatus W. A. F. McCallum
 Lock..... F. M. Galentin
 Lock and latch..... A. M. Carrier
 Locomotive grate shaker..... H. Swoyer
 Locomotive lighting system..... E. T. Ford
 Locomotive sander..... G. W. Frazier
 Loom electrical warp stop motion..... H. I. Harriman
 Log turner toothed bar..... D. R. Edwards
 Loom, Filing replenishing..... M. L. Stone
 Loom reed..... A. Saurer
 Loom shuttle..... A. R. Heritage
 Loom warp stop motion..... O. Reinhardt
 Lubricants to wire or other ropes, Apparatus for applying..... J. L. Bone et al
 Machinery, Means for controlling velocity and decreasing shocks and recoil in..... E. G. Shortt
 Mail box..... C. B. Harward
 Marlinespike..... F. Kappler, Jr
 Massaging instrument..... M. Doerr
 Measure, Angle tape..... J. A. Roe
 Measuring instrument, Angle..... C. Clark
 Measuring machine..... G. M. Bond
 Measuring the revolutions of rotating shafts..... H. Frahm
 Measuring the revolutions of rotating shafts, Apparatus for..... H. Frahm
 Mechanical movement..... C. & J. Dietz
 Mechanical movement..... A. Wahle
 Medicament vaporizer..... M. Saenger
 Mercurial regulator..... R. J. Fliinn
 Metal fabric..... P. J. Shrum
 Metals from solutions, Recovering..... I. Anderson
 Metals from their crushed ores, &c. Apparatus for separating..... W. N. Turner
 Metallurgical furnace..... E. C. Willis
 Milling tool, Adjustable hollow..... A. Elmiger
 Mine timber..... D. W. Bruntun
 Miter box..... D. F. Updegraff
 Moistening machine, Gummed strip..... J. E. Colvin
 Motion, Device for varying reciprocating..... C. F. Goddard, Jr
 Motor gear..... J. Havlj
 Music leaf turner..... W. Pilot
 Music sheet, Mechanical..... F. C. White
 Musical instrument note striking mechanism..... E. H. Klaber
 Musical instruments, Division indicator for mechanical..... F. C. White
 Nailing machine..... W. J. Darling et al
 Net, Fly..... C. E. Rhinehart
 News stand..... S. J. Richardson
 Nozzle, Jet..... L. Schutte
 Numbering machine, Typographic E. G. Bates
 Nut lock..... F. I. Bloomqvist
 Nut lock..... S. M. Hopping
 Oil burner..... E. W. Jackson
 Oil burner..... G. G. Calkins
 Oil burner..... D. H. Mosteller
 Oiler, Wheel..... W. D. Graves
 Ordnance, Smoke and gas ejector for..... A. Boucher et al
 Ore roasting furnace, Rotary rabbled..... T. D. Merton
 Organ, Pipe..... F. Zebrowski
 Packing..... A. O. Van Dervort
 Packing, Piston and piston valve..... J. T. Wilson
 Paddle wheel..... E. Chaquette
 Padlock, Permutation..... S. W. K. Miller
 Paper fastener..... E. L. Sibley
 Paper feeding mechanism..... J. S. Duncan
 Paper watermarking device..... E. R. & O. F. Behrend
 Parer, Fruit or vegetable..... M. Glasser
 Pea picking machine..... S. E. Kierolf
 Pen, Writing..... H. O. Reese
 Penholder..... C. C. Metheny
 Pencil holder..... K. H. Garson
 Pencil holder..... R. A. Nichols
 Pencil sharpener..... H. H. Brandes
 Pessary..... F. H. Brunig
 Photographs and kinematographs, Apparatus for synchronously operating L. Gaumont
 Photographic objective..... K. Martin
 Photographic plate holders, Exposure index for..... H. G. Rosslow
 Photographic printing apparatus..... F. Rachel
 Piano action..... A. A. Barthelmes
 Pick, Miner's..... M. Hardsocg
 Picture cover and frame, Combined..... J. S. Barcus
 Picture, &c. frame..... J. J. Sherman, Jr
 Picture frame..... L. Brand
 Picture transferring composition H. J. McKeel
 Pile driver..... E. S. Leach
 Pin joint..... A. Pollard
 Pipes, Apparatus for use in connection with manufacture of sanitary or other like..... R. Stanley
 Piping fluids..... J. D. Isaacs et al
 Piston grip..... G. C. Bourne
 Plant support..... F. Gompf
 Plant weeding and thinning out device..... B. J. Otto
 Pliers..... C. J. Carlsen
 Plow..... E. J. Rubottom
 Plow, Disk..... S. V. Weeks
 Plow, Sulky..... J. E. Russell
 Poke, Animal..... J. W. Seibert
 Power transmission mechanism..... B. J. Arnold
 Pressure mechanism..... E. T. Wolf
 Printing apparatus, Wrapping paper..... F. L. Mercer
 Projectile for loading practice..... P. A. Guye
 Propeller shaft, Screw..... H. S. Maxim
 Propeller shafts, Stern tube for screw..... J. Stephens
 Pulp, Machine for molding articles from..... M. L. Keyes
 Pulp screen..... N. B. Hayes
 Pumping power..... E. O. Weidier
 Punch..... H. C. Hart
 Punch, Combination ticket..... W. C. Downing
 Punches, Making..... H. C. Hart
 Punching machine feeding apparatus..... J. A. Reeves
 Pyrotechnical compositions, Making..... M. Magnard
 Quartz mill..... 2 pats..... E. Booker
 Quilling machine..... G. Sipp
 Rail joint bridge plate and fastening..... S. C. Ball
 Rail support..... L. Steinberger
 Railway block signal system W. M. Chapman
 Railway brake apparatus..... C. J. Fisher
 Railway construction, System of..... S. S. Elder
 Railway, Electric..... T. Mahoney
 Railway electric block signaling and telephoning system..... C. G. Otwell et al
 Railway rail saddle joint..... T. H. Gibbon
 Railway signal..... E. J. Relph
 Railway signal..... J. W. Anderson, Jr
 Railway signal, Electric..... E. W. McGuire
 Railway switch..... J. B. Reibel
 Railway switch and operating means therefor..... L. A. Lindsey et al
 Railway switch stand operating point locks and distant signals..... E. M. Robinson
 Railway switching and signaling apparatus..... J. D. Taylor
 Railway system, Electric..... 4 pats..... G. L. Cragg
 Railway system, Elevated..... F. E. Wilson
 Railway tie, Metallic..... H. W. Gander
 Railway tie, Metallic..... S. H. Kaufman et al
 Railway tie tamper..... N. Ferguson
 Railway track guard rail..... A. Corts
 Railway track joint..... J. G. Greter
 Razor casing, Safety..... A. W. Scheuber
 Razor holding and stropping device..... G. W. Mosby
 Razor, Safety..... H. J. Gaisman
 Record leaf..... E. W. Cruikshank
 Register..... G. Rein
 Resawing machine..... R. H. Benner
 Rheostat..... J. C. Barclay
 Road making and repairing machine..... J. Krohn
 Rolling mill..... I. D. Swindell
 Rolling mill conveyer or catcher..... C. Scholtz
 Rotary engine..... R. J. Rowe
 Rotary engine..... A. B. Chapman
 Rotary engine..... S. M. Wade et al
 Rotary steam engine..... A. E. Suiter
 Rubber tired wheel..... A. H. Marks
 Ruler..... A. H. Frink et al
 Ruling machine..... C. A. Keene
 Sanding and polishing machine..... F. Urban
 Sash cord holder..... E. Haas
 Sash lock..... L. H. Sparks
 Sash, Mechanism for actuating sliding window..... E. Feder
 Saturator bell..... A. N. Bailey
 Sawmill carriage offsetting mechanism..... E. E. Thomas
 Scale, Computing..... F. Mulligan
 Seal, Car..... W. K. Edgar
 Seed hulls or cotton waste, Treating cotton..... H. F. Bockmeyer
 Seeder and cultivator, Combined..... G. W. Denyes et al
 Seeding machine..... W. Sobeys
 Separating apparatus, Magnetic..... T. A. Edison
 Sewing machine cabinet..... W. C. Free
 Sewing machine shuttle race..... H. Mundlos
 Sewing machines, Variable speed driving mechanism for..... J. W. H. Uytendogaart
 Shade bracket..... H. Morris
 Shaft shackle, Vehicle..... S. R. Bailey
 Sharpener attachment, Cutter bar..... W. M. Pneuman
 Sharpening device, Shears..... J. N. Quinn
 Sheet feed or separator..... C. G. Harris
 Sheet folding or other machines, Delivery mechanism for..... C. A. Sturtevant
 Sheet metal parts, Means for uniting..... B. M. Steele
 Ship launching apparatus..... H. G. Morse
 Shirt waist holder, Lady's..... L. Kaufmann
 Signaling..... G. A. Huber
 Sink..... R. J. Meloney
 Smoke consumer..... F. C. Heim
 Smoke consumer..... J. F. Miles
 Snap hook..... A. A. Page
 Snap hook..... J. A. Zerbe
 Snap hook, 2 pats..... W. W. Broga
 Snap, Releasing..... R. A. Kettle
 Socket wrench, Reversible..... W. W. Murch
 Soldering iron, Electric..... S. Evershed
 Spark arrester..... G. H. Rood
 Spatula and cork extractor..... E. B. Jekis
 Spring wheel..... G. M. de Saint Leger
 Stacker, Hay..... W. A. & S. S. Cavett
 Stamp, Hand..... M. R. Flynn
 Stand, carriage and stool, Combination..... J. D. Leland
 Steam boiler..... 9 pats..... A. G. Hohenstein
 Steam generator..... P. G. A. Peugeot
 Steam superheating apparatus C. L. Simpson
 Steam trap..... A. K. Montgomery
 Stereopticon..... E. D. Clark
 Stone, Mold for the manufacture of artificial..... C. H. Hutchings
 Stone sawing machine..... G. H. Davis
 Stool, Cotton, berry, or vegetable picking or dairy..... J. C. Farley
 Stove, Combined heating and cooking oil..... J. H. Stone
 Stringed instrument mute..... F. Istas
 Stud, Spring..... E. Thielemann
 Sugar crystallizer..... G. Engel
 Surface heater..... W. G. King
 Suspender cast off..... H. J. Gaisman
 Swingletree or doubletree coupling..... S. Wyles
 Switch operating device..... 2 pats..... E. L. Pece
 Switch rail lock..... A. Schneider
 Switch socket and restoring annunciator, Combined..... A. M. Knudsen
 Table..... T. S. Usher
 Table lock..... J. K. Rishel
 Talking machine horn..... H. Sheble
 Tanning bath, Chrome..... C. A. O. Rosell
 Teeth, Filling..... E. Bosch
 Telegraph apparatus, Facsimile E. K. Gruhn
 Telegraph apparatus, Wirelsss..... J. Murgas
 Telegraphy, Wireless..... J. Murgas
 Telephone attachment..... S. C. Houghton et al
 Telephone call generator..... E. H. Strauss
 Telephone exchange..... C. A. Anderson
 Telephone receiver..... W. C. Runge
 Telephone switchboard signal apparatus..... D. C. Tanner
 Telephone switchboard signaling apparatus..... 2 pats..... E. H. Smythe
 Telephone transmitter..... A. W. Hill
 Telephone transmitter hood..... R. D. Fannon
 Telephonic apparatus..... A. Graham
 Testing machine grip..... W. J. Tretch
 Thermometer case..... H. A. Sievert
 Thermostat..... A. Roesch
 Thread guide..... L. T. Houghton
 Threshing machine..... J. McGrane
 Threshing machine..... J. M. Brasington
 Threshing machine band cutter and feeder..... J. E. Sponseller
 Ticket, Transportation..... P. C. Dockstader
 Tire, Rubber..... A. H. Marks
 Tire securing device..... M. A. Heath
 Tire turning apparatus, Roll..... T. L. & T. J. Sturtevant
 Toilet article..... M. Kohner
 Tomato skinning machine..... J. E. Trimble
 Tool..... D. Morris
 Tool holding attachment..... T. J. Gorman

Toy.....	J. M. Mills
Trolley.....	E. E. Gillingham et al
Trousers. Foot ball.....	2 pats. W. T. Stall
Truck. Elevating.....	W. M. Scott
Truck equalizing bar.....	S. A. Bemis
Truck. Hand.....	J. E. Minter
Truck or wagon frame cover.....	N. Nicolai
Trunk lock.....	E. C. Horner
Trunk strap.....	R. J. Nunn
Turbine engine.....	W. Wyand
Turbine. Steam.....	G. Code
Twyer attachment for blacksmith's forges.....	E. E. Taber
Twyers, cooling boxes &c. Leak detector for.....	A. C. Kroman
Type writer escapement mechanism.....	F. X. Wagner
Type writer key levers. Tension device for.....	B. A. Brooks
Type writer line spacing mechanism.....	J. H. W. Marriott
Type writer paper roll holder attachment.....	C. D. Williams
Type writer platen.....	J. H. W. Marriott
Type writer platen support.....	J. H. W. Marriott
Type writer supporting table and attachment.....	J. H. W. Marriott
Type writing machine.....	J. H. W. Marriott
Valve.....	W. H. Honsberger
Valve.....	J. H. Hussey
Valve.....	F. Tado
Valve and packing. Combined.....	T. Grant
Valve. Blow off.....	J. D. Kiser
Valve device.....	J. Kelly
Valve. Dry pipe.....	M. Suively
Vapor generating and lighting apparatus.....	F. H. Bissell
Vehicle draft bars. Brace attachment for pivoted.....	L. H. & A. C. Plank
Vehicle running gear. Power driven R. D. Scott	
Vehicle spring.....	N. Halverson
Vehicle storm shield.....	J. J. Russell, Jr
Vehicle wheel.....	W. D. Williams
Vehicles. Differential gear for power driven.....	R. D. Scott
Vending apparatus. Automatic.....	R. E. Payne
Vending machine. Coin controlled E. S. Bryant	
Vending machine. Coin controlled C. W. Miles	
Vending machine. Coin controlled.....	G. W. MacKenzie
Vending machine discriminator.....	J. J. Green
Vessel. Navigable.....	C. A. Maucker
Vessel sighting tube.....	S. Lake
Wagon body.....	B. F. Freeland
Walking elevator.....	H. Bryant
Washer.....	C. G. Ette
Washing machine.....	P. Farnquist
Washing machine.....	W. C. Fawkes
Washing machine.....	C. W. Cramer et al
Washing machine gearing.....	W. Ruthven
Watch. Stop.....	J. L. Newell
Water closet.....	E. Rousseau
Water heater.....	F. V. Bartlett
Water heater.....	J. Foster
Water heater.....	J. G. Hallas et al
Water power motor or engine.....	T. E. Frike
Water tube boiler.....	S. C. Munoz
Water tube boiler.....	J. J. O'Brien
Weeder and cultivator.....	L. J. & L. U. Ward
Welding apparatus.....	T. E. Rowland
Well casings. Means for sinking oil E. J. Beane	
Well digging apparatus.....	T. E. Law
Well drill attachment.....	W. L. Bruner
Wells. Foot valve extractor for R. Tittsworth	
Whistle operating mechanism. Automatic.....	O. C. Fisher
Willow.....	W. Francis
Winding machine.....	J. P. Cronin
Winding machine. Yarn or thread.....	J. King
Windmill regulator.....	G. M. Agee
Window chair.....	L. W. Niendorf
Window lock.....	T. H. Landers et al
Window screen holding device W. H. Fishburn	
Window screen. Roller.....	J. E. Buehler
Wood scraper.....	J. H. Banke
Wrench.....	F. W. Frey
Wrench.....	C. D. Colley
Wrench.....	G. W. Jessup, Jr
Wrench.....	M. F. Hudson
Wrench pipe attachment.....	S. J. Hinman

DESIGNS.

Cup.....	W. H. Deuble
Glass vessel or similar article.....	J. A. Jones
Match safe or similar article.....	H. L. Rothschild
Stove.....	G. W. Cope et al

Canadian Patents

Canadian Patents may now be obtained by the inventors for any of the mechanical inventions named in the foregoing list, provided they are simple, at a cost of \$30 each. If complicated the cost will be a little more. For full instructions address Inventive Age Publishing Co., 918 F Street N. W., Washington, D. C.

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Odd Things About Machinery.

Every-day things which are perfectly familiar to mechanics of one class are totally unintelligible to the workmen in another branch. Men who have worked a lifetime in fashioning cast-iron under the lathe are greatly surprised on learning that the same material, when employed in the heating pipes of a blast-furnace stove, grows from six inches to a foot in length from constant use. And the furnace man is equally unprepared to hear that the core bars used for casting pipes lose as much as three inches in casting twenty or thirty pieces.

In practice, for instance, we use a piston-rod packing of easy fitting babbitt bushing. When these bushes become sufficiently worn to leak, we close them up by compressing them in the water cylinder of a hydraulic press. In this operation a mandrel somewhat smaller than the piston-rod is put inside, and with all the pressure we can bring to bear, we have never been able to compress the bush so as to grasp the mandrel tight, and yet occasionally we have had these bushes shut down while the engine was running so as to grasp the piston-rod as if gripped in a vise, to break the bushes asunder, indeed, or to make this necessary in order to get them off.

Again, in the foundation of embossed work, two dies are used, the female die often being made by driving the hardened male die into a block of soft steel. This operation is easily performed by a few blows of the drop hammer. It drives in and raises the soft metal without distorting the block in any other particular. Had the same operation been attempted by means of the hydraulic press, the block would probably be upset one-fourth its depth, the sides bulging out or the piece crushed, without producing other than a faint marking of the outline of the male die.

When the lawn mower was first introduced, the inventor was considered little short of a mechanical heretic to imagine that he could get sufficient traction with two light wheels to rotate a cylinder six times their own weight at six times their velocity, and cut the grass in addition. The worm that drives the bed of a Sellers planer does not wear out half as fast as it should, and there is possibly something unexpected about it, even to the makers themselves.

A 12 x 18 inch cylinder engine, which had been running a year at 185 revolutions per minute on an unusually solid foundation, began one day without apparent cause to shake endwise, and before night had shaken itself loose. As no harm resulted and the work was pressing, the repairing of the foundation was postponed until vacation time, about a month distant. Before that time arrived, however, the shaking ceased, and the engine ran perfect smoothly in spite of the impaired foundation.

Another and even more curious instance of the unexpected was that of a well-known electrician who built and tested for three years a certain piece of apparatus which promised to be extensively used. As it worked perfectly, a large amount of capital was

put into buildings and plant for the production of these pieces of apparatus for the market, and many were built; but the manufacturers were totally unable to reproduce the original either in effect or durability.

In another case, two similar boilers were connected by necks at top and bottom, and a fire built under each of them, the boilers being about half full. The water, without apparent cause, behaved very strangely, all going into one boiler and then into the other. When the play was at its height, the boss, considering the lives of the men and the premises of more value than the cause of science, ordered the fires drawn, and the cause could never be determined.—*Railway and Locomotive Engineering.*

No Radium For Sale.

The Government mines at St. Joachimsthal, which have become famous since the discovery of radium, are in Bohemia. In the course of the manufacture of uranium colors, the radioactive element of the pitchblende (radium, etc.) remains in the residue of the alkaline solution of potassium salt, which, since the discovery of the fact that it contains radioactive substances, is being evaporated and sold to chemical works and institutions of learning for the manufacture of radium preparations. The quantity of residue of alkaline solution of potassium salts amounts, according to the extent of the manufacture of uranium colors, to 11,900 to 17,600 pounds per annum. Orders for this residue should be addressed as follows: "K. K. Bergwerksproduktion-Verschleiss-Direction, Vienna, Austria," or to "K. K. Berg-und Huttenverwaltung, St. Joachimsthal, Bohemia, Austria." There is, however, no pitchblende for sale now. Application should be addressed to the above-named officials for proper attention when any available supply is on hand.

New Finishes for Cloth.

Since the discovery of the possibility of imparting luster of fabrics by means of mercerization, the process has found many applications. While excellent in its results upon yarns, however, it has not been found so easy to obtain the proper finish upon goods except upon printed spots, and the luster has then been impaired by the necessary use of thickening. A recent French invention produces luster of unbleached fabrics by retaining at the printed places the dull appearance of the unbleached fabric, and lustering the unprinted places in a mercerizing bath. The fabric having been printed with a varnish unacted on by caustic soda, is mercerized when the varnish is dry. The caustic soda lye used is of different strengths, according to the composition of the fabric, and the time of immersion depends upon this strength. The fabrics are then rinsed, dried and passed through a benzine bath to dissolve and remove the varnish. The unprinted places then appear with a luster greatly enhanced by contrast with the dullness of the printed spots, giving the goods that much desired characteristic—novelty.

A German firm applies pastes composed of copper salts in conjunction with gum, china clay and sulphate of lead, to cloth which has been previously prepared with glucose, with the object of resisting indigo printing pastes, and exerting action in the vat. Thus, if the print be machine padded with indigo, aged, and dipped, effects will be obtained on a material which will show a different depth of color on the two sides. For printing calico, peroxide of lead, which also destroys glucose, is found serviceable.

In this connection, it is noteworthy that the permanency of finish of English goods, which has been the subject of lively interest on the part of United States manufacturers, is obtained by forcing dry steam through the fabric before the goods are pressed. The result is so permanent that the finish is not affected by the tailor's hot iron—or indeed by any subsequent operation.

Attention Inventors!

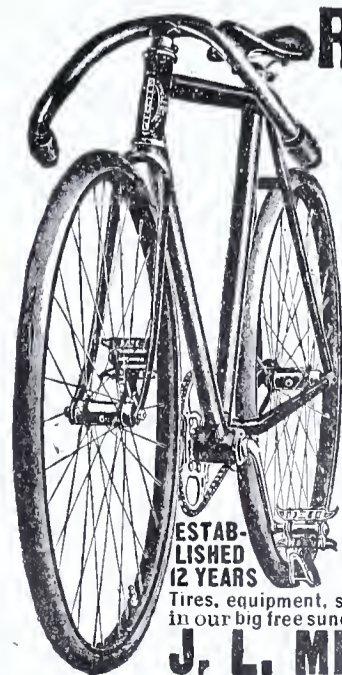
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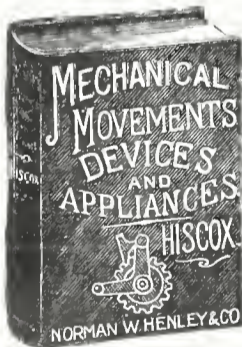
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No. 7.

WASHINGTON, D. C.—JULY, 1904.

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NEW FLOORING MATERIAL.

ARCHITECT SIEGWART, of Lucerne, Switzerland, has patented a new system of a concrete flooring, formed of hollow tubes of mortar and iron. It consists in manufacturing the mortar into hollow beams for forming a floor or roof ready for delivery to the builder—one which can be laid together on the supporting walls without planking. By this means one floor after another can be laid in a very short time, and the floor so laid can be used to work upon at once without scaffolding.

One advantage claimed for the Siegwart system is that no workmen

and are manufactured in five sizes, viz, 3.5, 4.7, 5.9, 7.08, and 8.36 inches high, according to the length of span and load. The size of the iron rods in the beams is between 1.96 and 3.9 inches, and generally six such rods are used in each beam. Two of these rods are laid parallel with the under border of the beam, and the other four are bent upward into the form of a knot at the ends in order to strengthen their holding power. The proportion of cement with coarse sand is 1 to 4. Though the beams are made hollow, they have the same supporting power as though they were solid, with a

up to 24.6 feet long. They can be used, in addition to floors, for terraces, roofs, staircase supports, and for walls where there is a side pressure, as, for instance, in coal bunkers, warehouses, etc. It has been demonstrated that with a load from four to five times as great as the normal, the beams have only bent to the extent of 0.0394 and 0.0788 inch.

The chief advantages claimed for these beams are: Great supporting power and security from fire: they come dry and hard from the factory and can, therefore, be used at once as floors for working on greater

the cement is laid and the iron rods placed in position. These iron molds are constructed so that they can be reduced in size by the turning of a screw and withdrawn when the cement has become hard. The beams are cut, before the cement has set, by means of a patent cutting machine, which can be placed in any position.

Six to eight hours after laying the beams the iron molds can be withdrawn, but they are generally left to harden for four to six days before they are separated. After two to three weeks they are ready for delivery.

There are already a large number



BUILDING IN COURSE OF CONSTRUCTION. SHOWING SIEGWART BEAMS.

are required other than the ordinary laborers. Another fact which should be considered is that armored beams, which are made in the building, can only be depended upon for uniformity when the mortar is mixed in exactly the same proportions, and when it is not influenced by shocks, frost, or rain during the time of setting. When this work is done in the factory it is far easier to secure uniformity and protect the beams against weather conditions.

The beams manufactured at Lucerne have a uniform breadth of 9.84 inches

great reduction of weight. This is an important factor where freight charges are to be considered. The beams, being hollow, offer also more favorable conditions for heating. The sides are ridged, so that the cement for joining them together can enter into the vacant spaces and thus form a solid mass. The laying together of the beams is done exactly as with wooden beams.

The beams are supplied in different lengths. In Lucerne they are made up to 18 feet long; in Italy and Germany, up to 21.3 feet long; and in Russia



SIEGWART BEAMS READY FOR SHIPMENT.

facility and speed in building is secured by their use; freedom from excess of heat and cold by reason of their being hollow: thickness of completed floors is reduced by their use; the beams can be used as a heating floor by sending warm air through them. The manufacture of the beams as practiced in the Siegwart Beam Factory in Lucerne, Switzerland, and in other European countries is very simple. They are manufactured in layers of 8 feet breadth and not singly. The hollow spaces are formed by means of iron molds, around which

of buildings, both public and private, in Switzerland in which the Siegwart beams have been employed, and in all the buildings now in course of construction in Lucerne they are being used.

At present there are three factories in Germany, three in Russia, and one in Italy occupied in manufacturing beams under the Siegwart patent.

The accompanying illustrations show the flooring with the Siegwart beams in a building in the course of construction, and also beams ready for shipment.

NOVELTIES IN ELECTRICAL TRANSPORT.

THE electric motor is steadily supplanting the horse, not only for pleasure cars but for business vehicles, and to those who will live at the end of the twentieth century, steam will doubtless seem clumsy and antiquated as a propulsive force. Recent tests of motor business vehicles in New York proved their great superiority to the horse-drawn carriages, in every respect. The automobile is being more and more used for delivery wagons, for fire engines, and for every purpose for which the horse was formerly considered indispensable.

been necessary to have heavy copper conductors throughout the line, and this, added to the fact that the transformers and rotary converters must stand idle except when the converted current is taken off and used by some passing train, has hitherto rendered the proposition economically impossible.

The new device does away with these cumbersome and expensive regulating devices, propelling the full-sized service car at any desired degree of speed, by deriving the energy from a single-phase alternating current of

ness for the purpose to which it was applied. No sparking or other technical difficulty was encountered, and the system proved to be so simple and direct that there would seem to be

dinary transformers, requiring no especial care, to the working-line voltage of say 6,000 or more. It is predicted that the new motor has bridged the chasm in electrical trans-



FIG. 1.—AUTOMOBILE SLEIGH USED IN RUSSIA.

The accompanying illustration (Fig 1) shows what is called an automobile sleigh, and though, of course, wheels are necessary for its progress, the shape of the car and the construction of the wheels are such as to especially adapt it for use in countries where snow storms are heavy. The type, it is said, is becoming popular in Russia.

In the line of electrical railways, an important step has been marked by the introduction of a motor of entirely new design—the invention of a young Austrian electrician, which has been successfully tried in Germany. Electric traction, which has proven so effective and economical for interurban and suburban service, has met hitherto some serious economic difficulties when applied to long distances. The method in use has been to send over the line alternating currents of high pressure, which are taken off at intervals by sub-stations equipped with converters that reduce them to a continuous current of low voltage, which is fed into the trolley wire or third rail and thus transmitted to the motors of passing trains. This works very well for short lines, adapted to city and suburban transit and thronged with steady traffic. But when it became a question of using the same method on a standard railway, connecting cities several hundred miles apart, the cost of the installation and operating expenses became practically prohibitive. Besides the sub-stations with their equipment, it has

6,000 volts, carried along the line of one small trolley wire and delivered directly to the motor without conver-

sion to a lower voltage or a continuous current.

Experiments with the new motor, made at Berlin, showed its effective-

ness for the purpose to which it was applied. No sparking or other technical difficulty was encountered, and the system proved to be so simple and direct that there would seem to be

mission, and opened the way to economical, and therefore practical, long distance electric traction on railways



FIG. 2.—AERIAL CONDUCTOR AND SUPPORTS.

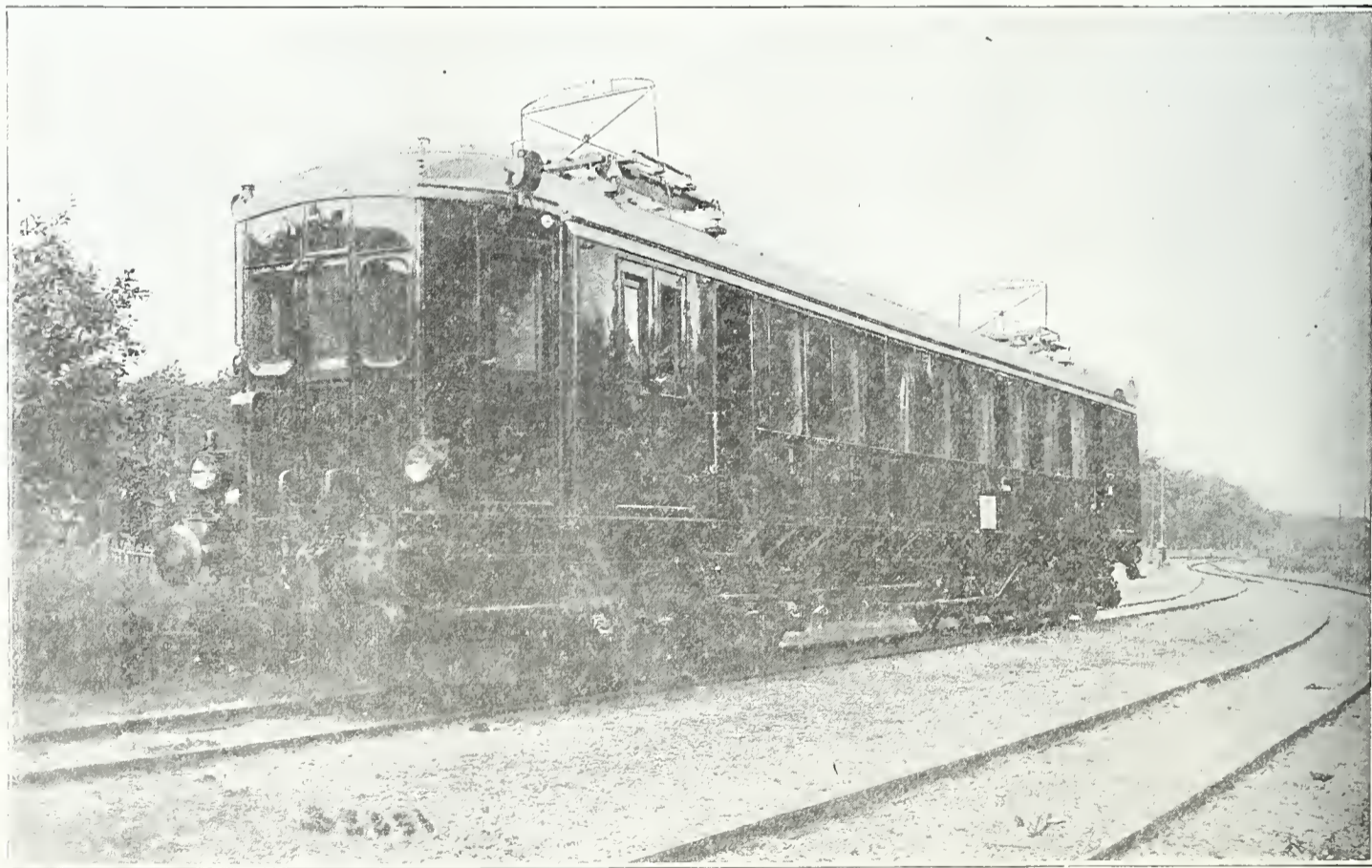


FIG. 3.—NEW MOTOR CAR.

may of course be transmitted from a waterfall or steam plant at any required pressure—say 20,000 or 50,000 volts—and then reduced in or-

of standard capacity.

The accompanying figures (2 and 3,) show the prepared line, with aerial conductor and supports, and the new motor car.

But the most striking novelty in electrical transport is what is called a magnet train, in which the weight of the rolling stock is subtracted by the aid of powerful magnets. At first glance, this would seem a physical impossibility, but a model that has recently been on exhibition in New York City shows that it is not only possible, but practical. The model consists of some eighteen feet of track, and a small car (see Fig. 4) which runs backwards or forwards magnetically suspended, with an ease that is remarkable. To better understand

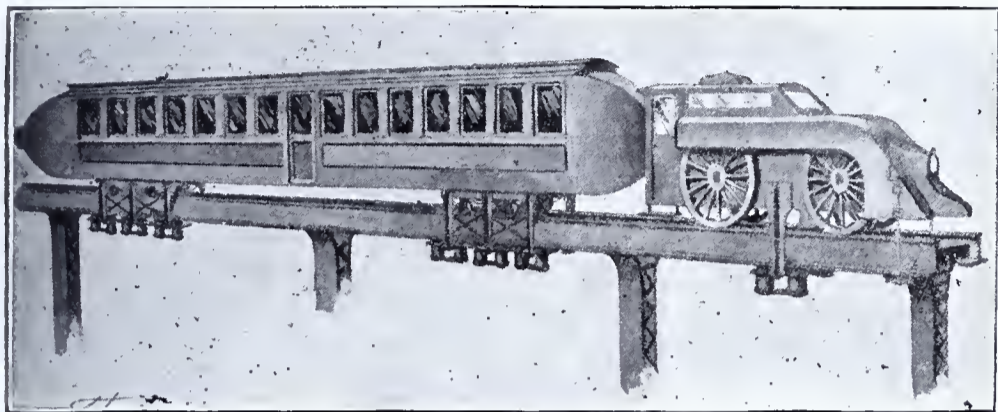


FIG. 4.—THE NEW MAGNET TRAIN.

how it is accomplished, let us suppose that a train weighs twenty tons. If we use magnets possessing an attraction sufficiently powerful to raise eighteen tons, the weight of the train will be reduced to two tons. It will be readily understood that under these conditions, the train would slide along the rails with a friction equal to one-tenth of the original weight of the train.

It would seem, to the casual observer, that whatever is gained by the reduction of locomotive power must be applied to the establishment of

magnets strong enough to lift a given weight. But this is not so. Five hundred amperes, for instance, will lift at least sixty tons, the moving of which ordinarily requires a steam locomotive, but which, suspended, can be drawn by a few horse power. The current for the purpose could be picked up from a wire along the track, or from storage batteries placed in the cars. It is reported that the model train has reached approximately the terrific speed of three hundred miles an hour. The invention has attracted considerable attention

from railway engineers, and capitalists are endeavoring to secure the right of way for a practical line of this kind. Whether this device fulfils all that is promised for it, so many improvements have been made in the line of electric traction—witness the successful working of the monorail, which at first seemed as much of an anomaly as the motor train, and the result of the high-speed experiments in Germany, which showed the feasibility of 100 miles an hour—that the next decade will doubtless witness some revolutionary changes in this method of transportation.

an hour later he left the place with words of gratitude, he took Huntsman's secret with him.

Another interesting story takes us to the neighborhood of Temple Bar, in London, and to the shop of a chemist who was the only man in England that knew the secret of the manufacture of citric acid. So jealous was he of his invention that he would share it with no one, but worked alone in the laboratory over his shop in Fleet Street.

One evening, however, when his processes were well advanced, he locked up his laboratory and left the premises for a time, assured that no one could possibly gain admittance during his absence. But he bargained without a certain uninvited guest who worked his way down the chimney into the laboratory, and made such good use of his time that when he re-emerged from the chimney, he had the manufacture of citric acid at his fingers' ends.

It was in a similar way that the manufacture of tin plate became possible in England—the secret being one which no person had been able to wrest from its owners in Holland for half a century. But there was a bold and crafty Cornishman, one James Sherman, who made up his mind to discover it at any cost. Going over to Holland, he found his way into the factory at great personal risk and brought the secret back safely.

These are but a few of the little romances of successful stealing, and who shall tell the number of attempts that have failed, or even how many lives have been lost in the attempting? Men will risk much to fathom such a secret as that of the monks of the

Grande Chartreuse, who made the well-known liqueur of that name, for which a sum of \$10,000,000 has been refused point blank: but the secret has defied all discovery.

Among scores of secret processes just as successfully guarded is that which has given to the world the exquisitely beautiful Dresden china. It is said that not even a king may enter the guarded walls of the factory at Meissen, where the porcelain is made, with the solitary exception of the King of Saxony himself; and every workman is under a solemn oath, to which the severest penalties are attached, never to breathe a word of what goes on within the factory.

Then there is the romance of inventions that have been absolutely lost to the world, of which one example must suffice. An American inventor named Ford, after long years of unremitting labor, had discovered a method of treating ore without smelting, and at a very small cost. So valuable was the discovery considered that fabulous offers were made to Ford for the secret: but, as ill-luck would have it, on the very day on which he had arranged to part with it in exchange, it is said, for an annuity of \$100,000, he was struck down by apoplexy, and his secret died with him.

The Boll Weevil Problem and its Solution.

It was Solomon who said: "Go to the ant, thou sluggard." and in desperation the Agricultural Department has turned to a species of ant in order to find some way to cope with the Mexican cotton boll weevil. As is well known, the boll weevil has cut in half the value of the cotton harvest of ten counties of Texas, which it has invaded. All efforts to check the weevil have been in vain. It has spread with the rage of an epidemic, until the southern states are dreading that they will see one-half of all of their cotton crop, whose normal value is five hundred million dollars, swept away. The boll weevil is a kind of a beetle living on the bolls of the cotton plant. A single pair of boll weevils will multiply in a single season into millions of ravenous and destructive insects. Some time ago the investigators of the Department of Agriculture learned of a variety of cotton grown by the Indians in Guatemala which seemed not to be subject to the attacks of the boll weevil. The Secretary of Agriculture accordingly despatched Mr. O. F. Cook to Guatemala, to ascertain whether it possessed in reality any quality enabling it to resist the boll weevil, or to learn other causes of its immunity from the attacks of the insect. A thorough search by Mr. Cook shows that the weevil is present and able to injure the cotton, but reveals also an active enemy which keeps it in check. This is a large reddish-brown ant, which is attracted to the cotton by the food which it secures from three sets of extra-floral nectaries. The ant attacks the beetle on sight and paralyzes it with a sting, and the business-like way in which the insect is disposed of, shows that the ant is peculiarly adapted for this work by structure and instinct. Efforts are being made toward introducing the ant to the cotton fields of Texas, but at present things are at a standstill, owing to the fact that a Texan has applied to the courts for an injunction to restrain the Department of Agriculture from introducing the ant, for he thinks that the ant may become a greater enemy to the farmer than the weevil. However, if Texas is inhospitable, Louisiana is prepared to receive the ant with open arms, and is willing to have the experiment tested within its borders, so that it is only a question of time when it will be known whether or not the Guatemalan ant may be relied upon to get rid of the cotton boll weevil, and thus save the cotton crop from destruction.

New Potentialities of Radium.

So much was promised for radium at the time of its discovery, that it is but natural that there should have been a reaction from the great expectations that were aroused. So marvelous and revolutionary appeared the properties of the new element, that it was predicted that it could accomplish everything, from the functions of the philosopher's stone to the curing of all diseases. Sensational articles were published, drawing pictures of the miracles that radium was expected to work. Conclusions were drawn which were the products of lively imagination rather than ascertained facts. The twentieth century, which loves to take the pose of critic and skeptic, is really credulous. It is willing to accept as true almost any assertion, and prediction, that may be made. The excuse for this lies in the fact that so much has been given us by science in the past few generations—steam, electricity, the telephone, liquid air, etc.—that there seems to be no limit to what it may bestow. Every new discovery is attended by exaggeration, with the inevitable result of disappointment. The same thing occurred, to quote notable recent instances, in the case of the X-ray and of Dr. Koch's famous cure. But both of these have demonstrated their utility in proper fields of action, and science, secure in its conservatism, awaits no less of radium. The latest conjecture—vouched for by no less an authority than Professor Rutherford of Montreal, in a lecture before the Royal Institution in London, comprising in the audience such men as Lord Kelvin and Professor Dewar,—is that the earth's heat is not attributable to the theory of a molten mass which has been slowly cooling for a million years, but to the presence of radium.

Professor Rutherford, whose cooperative researches with other eminent physicists to learn the properties of radium resulted in his being the first to measure the mass and velocity of the electrons of the mysterious element, pointed out, in the course of his remarks, that a single pound of radium emanations would produce sufficient energy to drive an Atlantic liner: but as seventy tons of radium would be needed to produce a pound of emanations, and as it is difficult to obtain so much as an ounce of radium, at a prohibitive price, it may not soon come into general use as a motive power.

Referring to the remarkable changes resulting from the disintegration of radium, the professor announced the probability that radium was contained in all matter. He thought that radium was proved to be in sufficient quantities in the earth to supply a new theory of the source of the earth's heat. If this were true, the many millions of years which geologists and biologists have reasoned out as the time taken in the cooling process which rendered the earth habitable, would not have been necessary. This proposition would mean a reconstruction of hitherto accepted facts, and would lead to the conclusion that the earth had been suitable for habitation for millions of years.

Radium, it has been found, is well, though finely distributed throughout the crust of the earth. Hardly a day passes without news of finds in some country, usually in deposits of uranium. In spite of this frequency of occurrence, the total amount of the mysterious element available will be relatively small, and it is not to be expected that it will cease to be the most precious stuff in the world.

Sir William Ramsay, the great English physicist, has recently stated that spreading ulcers have been cured with radium, and that it possibly may be an infallible remedy. On the other hand, no attempt at curing real cancer has been successful, except in the primary stages, when the treatment is about as beneficial as that of the X-rays. Cancers of long duration are too deeply seated to be reached by this treatment.

SECRET INVENTIONS.

In the Technical World a writer refers to instances where inventions, which the owners thereof sought to keep secret, have been attempted to be pirated by others, and mentions an instance where a watch maker named Huntsman, near Sheffield, England, had built a factory for making steel by a process of his own invention. The secret was a very valuable one, for it was the only process by which steel could be made of uniform quality throughout; but Huntsman had little fear that any of his rivals would discover it, for he employed only picked and sworn workmen, and the portals of his factory were almost as strictly guarded against strangers as the doors of a bullion vault.

However, one bitterly cold winter night, when the wind was shrieking over the neighboring moor, driving the snow in wild eddies before it, a tattered, shivering tramp presented himself at the door of the works and pitifully craved permission to warm his frozen bones at the furnace fires. For a long time he pleaded in vain; the doorkeeper was obdurate; but finally importunity and the pathetic aspect of the man won the day, and the tramp was admitted to the warmth, only to fling himself on the floor in utter exhaustion and to fall asleep.

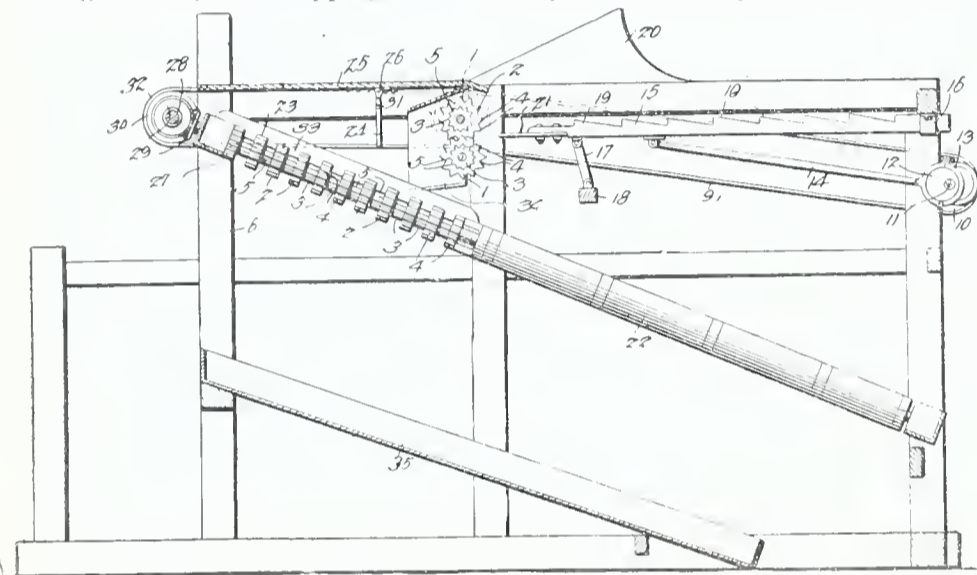
The rascal, however, was sleeping with one eye open, and with that eye he was craftily watching the men at their work, with the result that when

CLEVER NEW PATENTS.

HUSKING AND SHREDDING MACHINE.—DENTAL INSTRUMENT.—TOY GUN.—
WRENCH.—STATION INDICATOR.

HUSKING AND SHREDDING MACHINE.

Messrs. Simon S. Crieder and Isaac Korn, residents of Sterling, Ill., who are well known inventors in the art of corn-husking and fodder-shredding machines, have recently obtained a patent upon important improvements in the same. They employ a pair of snapping rolls, each comprising a plurality of circular disks spaced apart by collar disks of less diameter. The disks of each set are provided with peripheral teeth triangular in cross section, and the disks of the rolls are arranged in overlapping relation, that is to say, the larger disks of one roll are located opposite the smaller collar disks of the other, but not to such an extent as to cause the teeth to engage. The shredding and cutting rolls are inclined and extend upwardly above the snapping rolls. This causes the fodder to be so disposed longitudinally of the shredding and cutting rolls as to facilitate the action of the shredding and cutting disks in grasping the fodder and drawing it between the rolls, so that each stalk becomes cut in a number of small pieces. The lightest fodder drops from the snapping rolls directly onto the rear lower portions of the shredding and cutting rolls, and is therefore cut into but few lengths. The heavier the fodder and the stiffer the stalks thereof, the farther it is fed upwardly on the inclined shredding and cutting rolls by the snapping rolls and a peculiar arrangement of throat-feed.



Hence the same is caused to be cut into a number of small pieces and its value as feed considerably enhanced. One of the principal features of the invention is the employment of the snapping rolls in cutting the binding twine, as well as snapping the ears from the stalks and crushing and disintegrating the fodder prior to feeding the same to the shredding rolls. By thus adapting the snapping rolls to cut the bands by which the corn is bound, the fodder is fed in a loose condition from the snapping rolls, and is adapted to be cut into short lengths. The binding twine together with the fodder is also cut into short lengths. In case the twine becomes caught and partly wrapped upon the snapping rolls, the free end thereof will be caught by the shredding rolls and hence the snapping rolls will be kept clear.

DENTAL INSTRUMENT.

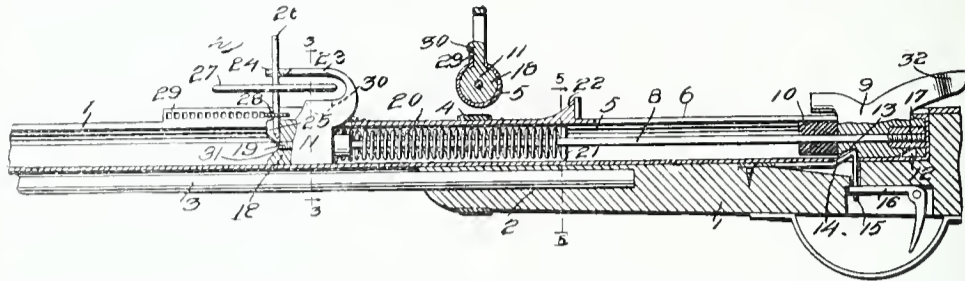
Those persons who have had to undergo the operation of having fillings removed from their teeth will hail with joy the advent of a dental instrument, recently invented by Mr. William J. Miles, Jr., of Middletown, Ohio. The removal of fillings is generally necessitated by an ulcerated condition of the root or irritation of the nerve, making the tooth sensitive, and heretofore it has been necessary to cut the filling by drilling and breaking the amalgam in pieces by suitable instruments. This has caused great pain to the patient. In carrying the new invention into effect, it is proposed to remove the filling by means of a heated tool, which, when applied, tends to allay the pain, and at the same time soften the filling to an extent sufficient to permit the ready re-



moval of the same. The tool consists of a handle having a shank at one end, provided with a bulb shaped head on one side and a thin blade on the other. In use, the instrument is placed over an alcohol lamp or some equivalent heating means and heated to a temperature of about 350° Fahrenheit. The head is then placed in contact with the amalgam, softening the filling and causing the mercury to rise to the surface. The filling is soon soft enough to permit the use of the blade, by means of which the amalgam is removed without pain to the patient or injury to the wall of the tooth. The application of heat in this manner will, to some extent, allay the pain, and the operation may be accomplished in a few seconds, as compared with a period from thirty minutes to one hour consumed in the removal of a filling by a mechanical disintegration of the same.

TOY GUN.

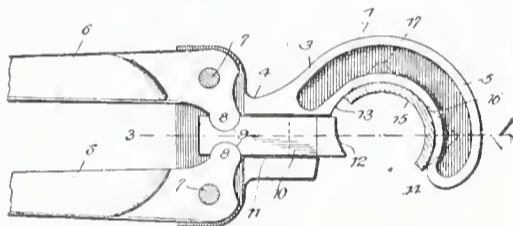
An interesting and attractive toy patented by Mr. Samuel E. Purdum, of Macomb, Ill., is a spring gun adapted for spinning tops. A one-half interest in the patent has been assigned to Mr. Louis N. Rost, of the same place. The general shape of the toy is that of an ordinary gun, and comprises a barrel within which is located a spring plunger, which may be employed for shooting arrows, marbles, or the like. A hammer constitutes a part of the plunger and is adapted to abut against a projection so that paper caps may be exploded.



The principal feature of the invention, however, resides in the employment of the plunger for spinning tops. A rack is secured to the barrel, and a slot is formed in the barrel alongside the rack. A bracket is secured to the plunger and slides in the slot. This bracket and plunger are adapted to support a top having a wall that engages the rack. Thus, when the top is in place, and the plunger is released, the wheel on the top will engage the rack so that said top will be rapidly revolved and then projected from the gun.

WRENCH.

Mr. William Littley, of Philadelphia, Pa., has patented a new pipe wrench, which may be readily adjusted for operating upon pipes of varying sizes. The head of the wrench is in the form of a hook made of two sections 2 and 3, secured together, having pivoted between them swinging handle levers 6, provided with inwardly extending knobs 8, at their pivoted ends. These knobs are seated in recesses

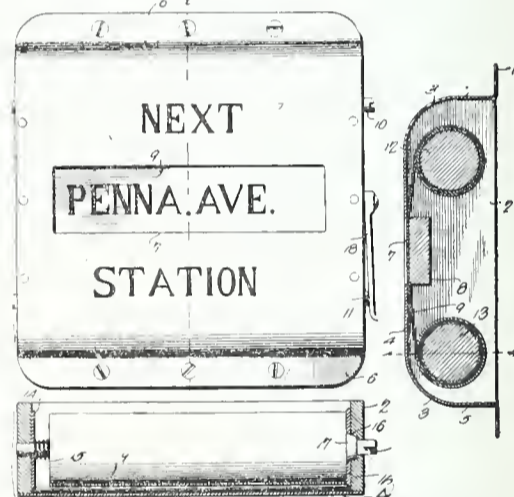


formed in a sliding member 10, that projects into the hook portion of the head and is adapted to engage a pipe placed therein. A head block 14, removably fitted in the hook is provided with a semicircular recess forming a seat for the pipe borne against by the clamping member. It will be noted that the head block can only be removed when the gripping member 10, is in a fully retracted position.

STATION INDICATOR.

While many station indicators have been patented, probably the simplest is one recently devised by John Jackson, of Grandcane, La. In carrying out his idea he employs a casing con-

structed of sheet metal and having an opening through its front wall. Rollers are journaled in the casing above and below the opening, and an apron, wound upon the rollers, is movable across the opening and contains the names to be displayed there-through. The rollers are each provided at one end with a cone enlargement fitted in the socket formed in the casing, and they are held in the



sockets by springs bearing against the opposite ends of the roller. Frictional brakes are thus formed which prevent the too free movement of the rollers and apron. A lever, pivoted upon one end of the casing, is adapted to bear against the cushions, and acts in opposition to the spring for the purpose of moving the cone enlargements out of their sockets.

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Fire Protection Devices

THE Baltimore disaster and the Chicago holocaust have attracted attention, all over the world, to means of averting such disasters. One of the most practical suggestions comes from London, *i. e.*, that all the materials used on the stage of a theatre—scenery, clothes, gauze, etc., be treated by the process adopted for the wood-work of American battleships. Various new devices for protection against fire have been brought before the public. One inventor of a method for fireproofing wood, places the timber to be treated in a vacuum, produced by pumping out the air. The cells are thereby freed of air, and the wood is impregnated under pressure with a solution of sulphate of ammonia and borax ammonia. This process renders the wood fireproof without affecting its color or texture.

A fire extinguisher recently tested in Germany employs a powder, the ingredients of which are secret, but which can be mixed with water so as to be effective in cases of conflagration, at a cost of only about five cents a pound. The solution, when prepared, presents a chalky appearance, but the inventor declares that it will not stain or damage woollen or cotton materials, which, while wet with it, will not burn.

In the first test, the inventor saturated some strips of bagging with petroleum, applied a match, and when the material was blazing, dipped his hands into a bucket full of the solution and slowly rolled the material into a ball, putting the fire out with no pain. The offer was extended to the spectators to make a similar experiment, and after some, not unnatural hesitation, one of the audience stepped forward and repeated the process, with the same result, and without suffering the least inconvenience.

The next test was made in a vat, of some five by three feet, which was filled with coal tar, over which petroleum was poured. This was ignited, and huge volumes of flame and smoke soon arose, forcing the spectators to retreat to some distance. When the fire was at its height, a few buckets of the solution were dashed over it, which had the immediate effect of quenching the flames. Within a few minutes, not a vestige of the fire remained.

A pile of logs, of about the size of railway ties, was then built in layers of two, to the height of twelve feet, and in the openings loose straw was stuffed, and two buckets of petroleum poured over the whole. A stiff breeze happened to be blowing, and a fierce fire was shortly in progress, which was allowed to burn for five minutes. The inventor then took up a hose attached to a hand pump, and sprayed the fire with the solution, extinguishing the blaze in about thirty seconds. This invention has aroused much interest on the part of firemen, manufacturers, etc., in Germany.

The illustration herewith given shows a smoke helmet designed for the use of firemen, although it can be

equally well applied in entering mining shafts containing noxious gases, or in other premises where the air is dangerously foul. The apparatus consists of a helmet, a pair of bellows, and air hose. Through the latter, the person wearing the helmet is supplied from outside with the necessary fresh air in the same manner as in a diver's outfit.

The helmet is made of stiff leather, with a projection for the nose. Square glasses for the eyes are inserted, and it has a soft neck collar. The helmet encloses the whole head, so that the eyes, mouth and nose are protected, and as the helmet is light and comfortable, action of these organs is perfectly free and unimpeded. The superfluous and expired air escapes through a valve at the top of the helmet. In this way, the head of the wearer is constantly fanned by a fresh and cool current of air, and he is enabled to remain for hours in very



Breathing Apparatus for Smoke Helmet.

hot rooms, filled with smoke or noxious gases. The helmet also has a speaking tube device, rendering it possible for the wearer to converse freely with an assistant outside, up to a distance of 160 feet.

Another safety device—especially adapted for the theatre—is the use of glass for curtains, to take the place of asbestos. A Bavarian factory has discovered a method of making glass by which it is rendered as malleable as metal, as well as capable of being drawn out in sheets or threads, and is absolutely non-breakable. Cooking utensils made of this glass stand the heat of the fire without cracking or melting. An extraordinary test to which the new material has been subjected is that of patching—which can not be done with any glass made in America. A plate of the Bavarian glass has been bored and the hole plugged with the molten composition. The result is a smooth, impervious patch, different in every respect from the result obtained by cementing in a

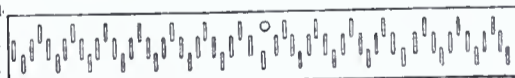
piece, as would be done with the old style of glass.

With a goblet made of the new glass, one can hammer a nail into a board of the toughest wood. It can be readily seen that it would be well adapted for fireproof theatre curtains, and it would also greatly enhance the safety of sky scrapers to use this material in the windows in place of the ordinary glass now employed, as it would not only resist wind, but would render the buildings much less liable to catch fire, in case of a general conflagration, such as the one in Baltimore.

One prolific source of fire, especially in the West, is the passing locomotive, with its scattered sparks. The forest fires that have raged in our country within the past year, with the deplorable losses of property and life that were involved, lend a practical interest to the methods employed in other countries for averting similar dangers.

In Germany, every precaution that can be devised to prevent the escape of locomotive sparks has long been practiced on the railways. The problem everywhere is to devise a metallic network fine enough in mesh to effectively sift the glowing sparks from the blast of a locomotive without so obstructing the draft as to compromise its steaming capacity. Hitherto, the bars or filaments of network spark arresters have been mainly round and fixed in place—conditions which always entail more or less danger of choking and clogging, whenever the space between meshes is small enough to really prevent the escape of sparks and glowing embers of dangerous size.

These requirements have led to an ingenious improvement by an engineer, which has been used on certain roads for a couple of years, with such success that it is about to be more widely adopted. The device consists of a series of three grates, set one above another in a square iron or steel frame of such size and form as to fit into the smoke chamber of the locomotive. The arrangement of the three tiers of grate bars are shown by the accompanying section.



Each bar is two inches wide and one-tenth of an inch thick, and is set into the frame so as to be held firmly against any shock or pressure, and at the same time to be free to expand or contract with changing temperatures. As shown in the diagram, the middle tier of grate contains twice as many bars as the top and bottom tiers, and the arrangement of bars and spaces are such that while a free passage is allowed for the gases of combustion, no spark or ember more than one-sixteenth of an inch in thickness can escape, and these are so small that they extinguish themselves almost as soon as they escape into the open air, and thus involve no danger. This ingenious arrangement of the bars, together with the readiness with which they expand and contract under varying temperatures, acts

to dislodge the adhering particles and prevents the arrester from becoming clogged, and at the same time permits a draft so open as to maintain the steaming capacity of the engine, said to be visibly greater than with any other type of spark catcher used in Germany.

Automobile Railway Cars.

For some years past Messrs. Gardner & Serpolet, of Paris, France, the well-known manufacturers of steam motor cars, have been making experiments with a view to applying the same system to railway cars and give each car its own motive power. These experiments have taken practical form, and the system is now in use on two tramway lines in Paris, and has been used on a short line in Wurttemberg (Germany) for some time past. It will in a few weeks be tried on a more extensive scale on the Paris, Lyons and Mediterranean Railway, and if successful may revolutionize railway travel.

The advantages of such a system are obvious. The fastest express train does not ever average more than 55 miles an hour, and this speed could not be greatly surpassed without increasing the weight of the engine and consequently causing extra wear and tear of the road. An express locomotive of the present day weighs about 110 tons, and a great part of this weight could be saved. It should be mentioned that automobiles have accomplished 80 miles per hour on the high road, and could of course far exceed that speed on steel rails.

Another great advantage is that trains would not have to stop in the course of a long run to take in water or fuel. The longest run made by any English train without stoppage is rather less than 200 miles, but an "automobile" could easily go four or five times that distance.

In a few weeks' time, cars of this kind will be running on some of the branch lines of the Paris, Lyons and Mediterranean Railway. The cars will not be coupled together, as the French regulations discountenance that, but each will have its own motor and carry from 30 to 40 passengers with about 2½ tons of baggage. The speed will be restricted to 30 miles an hour.

Arrangements are also made to run a line of cars between Antwerp and Brussels at a rate of 75 miles an hour, and even this high speed could be exceeded if desired.

The cost of such a car as has been mentioned above would not exceed \$10,000, machinery and all. No stoker is required, as the petroleum is pumped to the burners mechanically. The motion is devoid of jerking, jolting, or shaking, and the inventors assert that the train could be stopped in 200 yards, even when traveling at over 70 miles an hour. The only danger to be guarded against is that of fire from overheating.

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MECHANICAL INVENTIONS AND DESIGNS

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John Ditson, Galena, Kans. Rolling and Trimming Machines for Disks. The invention is intended primarily for trimming and sharpening the disks of harrows, plows and other agricultural implements, though the same is not limited in this respect. The object of the inventor is to produce mechanism for sharpening disks by cold-rolling the edges thereof, and, at the same time, trimming such disks so that their circular shape is maintained. To accomplish these objects, a supporting frame is employed, within which are journaled power-driven rolls, having powerful backing supports, one of the rolls and its support being adjustable. The rolls are provided on their peripheral faces with enlargements, one of which is beveled, and between which the margin of the disk to be treated is engaged. A trimming knife or blade is adjustably mounted on the supporting frame at one side of the rolls. The mounting for the disk consists of a slideway pivoted to the support and swingingly adjusted thereupon. This slideway carries a table that is adjustable in various directions, and in turn supports a pivot upon which the disks are journaled, while being operated upon.

William F. Jaenecke, North Tonawanda, N. Y. Clutch.—Improvements in clutch pulleys is the subject matter covered by this patent, and the object, which is successfully accomplished, is the provision of means that is positive in operation and not liable to accidentally lock when in inoperative position, or unlock when in operative position. Moreover, the mechanism is completely enclosed so as to be protected from injury, dirt and dust, and having no projecting portions liable to catch the clothing of workmen employed about the same. Briefly described, the pulley is loosely mounted on the shaft, and the flange thereof has on its inner side an annular groove, V-shaped in cross section. A face plate closes one side of the pulley and has a hub, keyed or otherwise secured to the shaft. The face plate carries on its inner side, jaws having shoes that engage in the groove of the pulley. The jaws are operated by gearing projecting through the face plate and comprising either sprocket wheels and chains or intermeshing gear wheels. This gearing is actuated by a casing head covering the same and having a groove, receiving the usual fork of an operating lever.

Ambrose P. Ward, Cedar Rapids, Iowa. Button.—The invention relates to that class of buttons commonly employed in connection with collars, cuffs or sleeves. The object is to provide a simple article that is extensible and contractible so that it may accommodate itself to the various thicknesses of the articles held, and has all the advantages of a separable and swinging head button, without the worst objection to the former, namely, the liability of the members becoming separated and lost. The shoe of the button has an upstanding shank section that is angular in cross section and telescopically receives another shank section, carrying at its projecting end a swinging head. The sections, while freely slidable with respect to each other, are held against disassociation by a pin and slot connection. They are adapted to be locked in different relative positions by latches located within the shoe section

and having teeth that engage teeth formed in said shoe section. Actuating pins for the latches are located in the swinging head. The entire arrangement is certainly novel not only in general arrangement, but in the various details of construction.

Frank P. Johnson, Danville, Pa. Garment Hanger.—The invention is in the nature of additions to a folding hanger, which Mr. Johnson has, for several years, placed upon the market. The object is to provide clamping means adjustable to the sundry widths of the different articles to be held. The usual folding hanger, with which the improvements are preferably used, is formed entirely of wire and has spaced sets of hanger rods or arms. The garment-supporting devices are each formed of a single piece of wire, having looped portions arranged side by side forming coacting jaws. The connecting portions between the jaws are coiled, and the terminals of the wire are also coiled about the rods, being slidable thereon and constituting clutch loops having frictional engagement with the rods, so that they will maintain their position wherever placed.

George E. Brown, inventor; Selma, Cal., Jacob Wright, assignee, same place. Four patents. Three of these patents relate to devices for supporting the limbs of fruit trees, and for preventing the latter from being injured by the supporting devices. These devices, which are freely adjustable to permit their ready application to the different trees, do not interfere with the growth of the same, and are arranged in such a manner that one limb will contribute to the support of another, so that a tree will be prevented from breaking down under the weight of the fruit. The chief merit of these devices lies in their great simplicity, strength, and in the ease in which they can be applied to all kinds of fruit trees. Two or more limbs may be connected together, and the limb-engaging devices will adjust themselves automatically to the inclination of the limbs.

The other patent relates to a fumigator, adapted for introducing poisonous fumes, smoke, etc. into the holes, burrows and nests of gophers and similar animals that burrow under the ground, and destroy crops and vegetation. It comprises a chamber for generating the smoke, fumes, etc., and a blast device having its inlet in communication with the generating chamber, and its discharge end in communication with a flexible discharge pipe, which is adapted to be introduced into the holes and burrows.

Simon J. Harding, Harrisburg, Pa. Washing Machine.—The washing machine of this patent is designed to be mounted on an ordinary tub or receptacle, and enables the operator to stand in an upright position, and it also applies soap automatically to obviate the necessity of soaping clothes by hand. The clothes and other fabrics may be rubbed to any desired extent, and water is automatically discharged upon them while they are being rubbed. The machine comprises reversely-movable rubbing devices, and a pump, which is operated by the rubbing devices. The soap is carried by one of the rubbing devices.

William Schluter, New Hartford, Iowa. Draft Equalizer, and an Attachment therefor. Two patents. The draft equalizer is designed for corn harvesting machines, and is adapted to place the draft centrally of the machine in rear of the cutting apparatus, the draft animals being so disposed that one of them travels between the rows, and the others upon the stubble

side of the field without interfering in any manner with the cutting apparatus. The attachment, which is employed in connection with the draft equalizer, is adapted to support the reins above the tops of the corn without interfering with the free use of the reins. The rein supports are mounted on the hames, and are provided with resilient arms, which extend above the corn and carry guides for the reins.

Ezra W. Witter, Easton, Pa. Dental Appliance.—The instrument comprises a pair of relatively adjustable reflective plates oppositely inclined transversely and connected at one end by a hinge. These plates are relatively adjusted by a screw to clamp several teeth between them. When in position, the plates serve to depress the tongue and retract the cheek so as to keep the tooth being operated upon perfectly dry. Not only that, but the reflective quality of the plates causes the teeth to be illuminated to facilitate the treatment and, if desired, cotton or other absorbent material may be held against the gums by the instrument to absorb the moisture. The connected plates are manipulated by means of a handle, which is detached after the device has been properly positioned in the mouth.

Henry Rembert, Willis, Texas. Method of Baling Cotton.—The method devised by Mr. Rembert is a distinct advance in the art of making cylindrical bales, since it produces without injury to the fiber, a bale of great but uniform density, having a comparatively soft centre, and formed without a core. The method consists in first forming a loose bat, which is then wound layer upon layer, without compression in detail and without the use of a core. The soft bale thus formed has a hollow centre, and is next subjected to pressure at two or more separated points, the bale being constantly rotated in the direction of the winding of the bat during the application of the pressure. By this means various portions of the bale are successively presented in the line of compression, and the product is a cylindrical bale of from twenty-five to thirty pounds density throughout, the hollow at the centre of the bale being filled by the inward yielding of the fiber which is thus prevented from being unduly condensed or hardened. The bale produced by this most ingenious method possesses all of the advantages of the ordinary cylindrical bale, and none of the disadvantages.

Peter Lassen, Wetmore, Texas. Plow.—This plow is a novel implement for plowing out stalks without turning the ground or covering the stalks, the latter being prevented from falling in front of the plow standard and thereby impeding the movement of the plow. The implement includes a frame, comprising a pair of metal plates disposed edgewise to the ground and retaining a plow point, a beam, and handles, organized in a rigid structure. The frame is equipped with provision for the detachable connection of a pair of oppositely extending plates, by means of which the plow may be readily converted for use as a single or double sweep.

David James and Lorenzo D. Rusher, Coffeyville, Kans. Vending Machine.—This machine is intended to vend cigars, or similar objects, from their original boxes or packages. A box of cigars is placed in a suitable receptacle upon the interior of the casing, and the cigars are arranged to be delivered one at a time by a carrier to which the cigars are supplied by a feed slide, operating in conjunction with novel devices for insuring the proper feeding of the cigars from the box. The carrier is

operated by mechanism located upon the exterior of the casing for manipulation by the vendee. Normally, however, this mechanism is disconnected from the feeding devices and carrier and cannot be connected except by the deposit of a coin through a slot in the casing. If, however, a person desires to purchase a cigar, it is merely necessary to deposit the proper coin and turn a crank, the cigar being delivered through an opening in the casing, and the parts returned to their normal positions for a repetition of the operation when another coin is deposited.

David James, Coffeyville, Kans. Vending Machines. Two patents.—The first of these patents discloses a cigar vending machine of that general type disclosed in the James and Rusher patent above noticed, but involving a number of important improvements. It is well understood that cigars are packed in boxes row upon row, and that the pressure applied in the process of packing causes them to stick together and to assume various transversely angular shapes. They furthermore assume a more or less irregular arrangement within the boxes by reason of the fact that in boxes of fifty the rows contain alternately twelve and thirteen cigars, the rows containing the larger number being more closely packed. By reason of these irregularities of form, size and arrangement of the cigars and of their tendency to adhere, many difficulties are encountered in the production of a machine for feeding and delivering them one at a time with that certainty which is absolutely essential in coin controlled vending devices. With a view to overcoming these difficulties, the first James patent embodies novel means for separating one or more cigars from those in the box and for depositing them in a chute, from which they are removed by a feed slide. Another novel feature is an arrangement of devices for loosening the cigars in the chute to prevent the choking thereof, and a further novelty is an ingenious feed slide which accommodates itself to cigars of various sizes and shapes, and which co-operates with mechanism so arranged that the obstruction of the slide is at all times prevented.

The second patent discloses a clever arrangement of coin-controlled mechanism for use in connection with the vending machine. At the rear end of the machine is disposed a rock shaft connected with an operating handle outside of the casing. Surrounding the shaft is a sleeve, which is connected with the feed slide and carrier of the vending machine. Mounted on the sleeve is a detent provided with a coin receiver and a beak. When a coin is deposited in the machine, it drops into the receiver and swings the detent into engagement with the shaft, thus connecting the shaft and the sleeve and permitting the operation of the machine by the crank. When the operation has been effected, the coin drops out of the receiver, and thus when the parts are restored to their normal positions, the shaft and sleeve are disconnected to prevent further operation of the machine until another coin has been deposited.

Benjamin F. Van Camp, inventor; The Indiana Burial Vault Co., assignee. Indianapolis, Indiana. Burial Vault.—This patent granted to Mr. Van Camp, and now controlled by the Indiana Burial Vault Company, discloses a vault composed of a number of separate, molded sections of plastic material, strengthened by metallic frames imbedded therein. In use, these sections are joined together, and after the casket has been placed in the vault, a sectional cover provided with automatic locking devices is put in place, and automatically locked to produce a vault or chamber which is absolutely air and water tight, and burglar proof.



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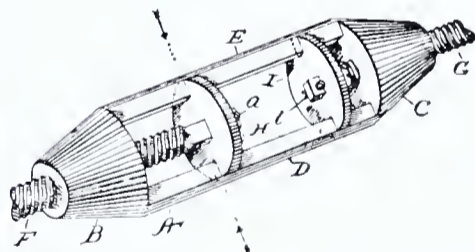
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Inventors Acting as Their Own Attorneys.

In the history of the Patent Office, there will always be a time when a certain class of inventors will essay to prosecute their applications for patents in the endeavor to save attorneys' fees, or for fear of having their ideas stolen; and today the idea is just as prevalent as it always was, notwithstanding the fact that experience has shown that an inventor who files his own application and prosecutes it through the Patent Office is liable to err ninety-nine times out of a hundred. There is an old saying that "the man who is his own attorney, has a fool for his client." This is literally true so far as applying for patents is concerned. The Supreme Court of the United States, in *Merrill vs. Yeomans*, said: "The growth of the patent system in this country has reached a stage in its progress where the variety and magnitude of the interests involved require accuracy, precision, and care in the preparation of all the papers on which the patent is founded."

Notwithstanding this, we find an inventor applying for a patent on his invention, and acting as his own attorney where he has had no previous experience. It seems easy to him after obtaining a copy of the Patent Office Rules of Practice, and copies of a few patents. He proceeds to write out his own description, draw the claims, and has the Patent Office make the drawings. Of course he knows nothing about the state of the art in the class in which his invention relates. He is unfamiliar with the practice of the division of the Patent Office to which the application will be assigned, and right here it may be stated that each of the thirty-eight divisions has a practice of its own, which can only be learned in the school of experience. He is not conversant with the ruling decisions of the various Commissioners of Patents, and the Federal courts of the

United States; but, casting all this knowledge to the winds as being superfluous, he proceeds to make the application and prosecute it through the Patent Office. He labors under the delusion that when the Patent Office grants him a patent, it will be sure to protect his invention, and by the way, this is what caused him to dispense with the services of an attorney. He does not know that it is the practice of the examiners in some divisions of the Patent Office to prevent inventors from obtaining broad claims. He does not know that in a few divisions of the Patent Office it is the aim of the examiners to keep inventors from obtaining patents. He does not know that in certain of the divisions of the Patent Office, where a patent is granted the examiner will not consent to its allowance until the claim is made so weak as to be absolutely valueless. He ought to know these things, but he does not. He thinks because the invention is his own, that he knows more about it than anybody else, and perhaps he does; but there are more things that he ought to know, and should know, before he attempts to secure a patent on his invention. The relation of the invention to the prior art should be ascertained. The exact improvement should be measured, and then the claims of the application should be drawn as to cover the improvement. Very often, a word will change materially the scope of a claim. We have known of instances where attorneys have spent hours 'n thinking of a proper word to use in the claim, well knowing that the value of the patent depends largely on the correct selection of the word which would be sufficiently comprehensive to include later improvements.

The trouble about the inventor who acts as his own attorney in applying for a patent, he never thinks about making the claims of his application broad enough to include improvements made by others in the future. He simply knows what his own device is, thinks it is perfection, and cannot see how it can be improved. But if an attorney were called into the case, he would look at it from a different point of view. He would first study the invention, then review the state of art, and with knowledge of the decisions of the courts, and recognizing that the value of the patent depends on its claims, would so draft them as to not only embrace the particular improvement set forth in the application, but endeavor to include in its terms, inventions which may be made by others thereafter.

Considering the comparatively small fee required by most attorneys in prosecuting applications before the Patent Office, it is the height of folly for an inventor to fritter away his invention by trying to act as his own attorney, when he can secure the skill, the judgment, and the work of an able attorney who will look after his interests in preparing formal papers in the case, and prosecuting it before the Patent Office. We cannot impress on inventors too strongly the absolute necessity of their employing attorneys to represent them before the Patent Office, and in selecting an attorney, Washington is the place to apply. The city is full of able ones; in fact, the best patent solicitors in the country are located in Washington, and it is natural that they should be, because the ideal place for a patent solicitor is in Washington, where he can, by interviewing the examiner, by constant association with the officials of the Patent Office and easy access to the records, become more competent to transact the business of soliciting patents.

An Alleged Weak Spot in Our Patent System.

The Electrical World and Engineer refers editorially to what is considered to be "a conspicuous defect in the patent system," and says: "At the present time, almost every class in the Patent Office is rich numerically in inventions. An attempt to work up the state of the art in almost any line discloses large numbers of more or less conflicting patents running back over a long term of years. Of these, very few are fundamental in their bearing upon the art. Most of them are interlinked with their predecessors in a more or less complicated fashion, and belong to the category of improvements; but of the whole mass of patents, primary and secondary, only a very small percentage have any record of practical usefulness. The vast majority is composed of patents unsuccessful, and entirely unworked; or, of patents, taken out for purely defensive purposes and never intended to be worked. The result is that the inventor honestly striving to produce an article of industrial importance, continually finds his way blocked by prior patents touching his invention, more or less remotely, but still sufficiently in the way to hinder material improvements or to control them if made. How to avert this trouble is a very serious problem." The journal suggests that some system requiring patents to be worked ought to be provided, so as to get the unused and unsalable patents out of the way, without waiting seventeen years for them to die of old age.

We cannot agree with the Electrical Review and Engineer. To introduce the scheme of working a patent in this country, would retard the progress of invention. One of the most serious objections to foreign patents, made by American inventors, is that provision which requires the invention to be worked in the countries where patents have been taken out, in default of which the patents become null and void. If such a law was in force in this country, the poor inventors would invariably suffer, for the rich ones could easily work their patents without any serious drain on their purses.

Suppose it was required under the patent law, that within two years after the patent issued in this country the invention had to be practiced? It can be readily seen that this would place patentees wholly at the mercy of manufacturers, and reduce the value of patents to the holders thereof, for the manufacturers would then hold the key to the situation. Many an inventor spends all he has, and a few are obliged to borrow money, in order to obtain a patent on an invention which has been a life study, and they are content to do this, knowing that if the patent issues, no one can take it away from them, and they are not obliged to practice it, but can wait until its merits are recognized.

If the inventor had to work his invention within three years after obtaining the patent, how would he go about complying with the law, were he penniless? He would either have to let the patent go by default, or practically give it away to some manufacturer in order to have the device manufactured.

It is true that there are instances where earlier patents have stood in the way of improvements, but those who are last in the field ought to be willing to pay for such patents as are ahead of them. The men who preceded them and took out patents on their inventions, which patents must be purchased in order to avoid infringement, are entitled to their reward as pioneers. We can recall numerous instances, where prior patents which were unworked and apparently unsalable, became of value because of later improvements made by others along the same line, making it necessary for the later inventors to purchase the prior patents in order to protect the improvements. If, how-

ever, the patent law had contained a provision which required the patentees to manufacture the inventions within two or three years, said patents would have been null and void. Even the man who invented the later improvements would have obtained no benefit by this fact, because he could not secure in his own patent, claims which were in some prior abandoned patent.

From the standpoint of the manufacturers, the defects enumerated by the Electrical World and Engineer, may exist, but the inventor, and it is he who should be encouraged, finds no fault with the present system. He is the one who would suffer by the incorporation of a provision in the law requiring a patent to be worked within a certain period after the issuance thereof.

It would, indeed, be an evil hour in the history of the patent system of this country, should the views of the Electrical World and Engineer triumph, and the present beneficent patent laws be amended so as to deprive inventors of their hope of reward.

Machines that Think.

Many of the recent inventions are so intricate and ingenious that they surpass human fingers in deftness, and almost equal the human brain in their ability to perform operations that formerly required thought. The type-setting machine, to take a notable example, is so remarkable in the elaboration, accuracy and completeness of its working, that if it had been presented to the world two centuries ago, it would certainly have been smashed to pieces as a production of the black art, and its inventor burned at the stake. Other lines of industry boast contrivances no less marvelous. A new machine for decorating crockery, puts on the china, by a single action, the border patterns and monogram centers, which formerly required a whole process of handwork. The machine is operated by compressed air, and has a maximum capacity of decorating in this manner 120 dozen pieces of crockery in a single hour; and it requires human assistance only in the form of two boys.

A novel speed indicator has been added to locomotive practice that not only indicates the varying speed of the engine, but automatically applies the brakes when the speed exceeds the established safety limit, thus successfully replacing the "speed feel" of engineers. The dynograph, described on another page of this issue, is another triumph in railway operation.

To do away with guesswork in office and shop management, and to find out the real amount and value of each and every different kind of labor expended on a given piece of work, there is a machine which makes a permanent record by card printing, not only of a single period of time, but also of an indefinite number of periods. This record shows the number of hours and minutes put on the job, and also the time of day when it was begun. When the task is done, the totals of labor costs are entered on the outside of the envelope containing them, together with a record of the material used. Each record is entered on the factory books for permanent reference.

In modern factories, not only is clothing stitched by machinery, and button-holes made, and embroidery done, but buttons are sewed on to both garments and shoes. A machine sews 5,300 buttons on garments in 9 hours—or more than eight expert sewers could possibly do in the same time. Nor does this machine require an expert operator.

In an office, where it was formerly necessary for a number of clerks to copy names on reference cards to be filed in various places, one clerk now writes the name on a single card with metallic ink, clamps it in a holder with a number of blank cards, and flashes an X-ray through the packet. Thus by a single motion one man writes, or rather prints, all the cards.

SCIENTIFIC

PROGRESS.

Life Belt.

A new invention is a life belt, composed of a series of four small, flat sacks, circular in shape and connected by a tube. The ends of the tube are enclosed in small metallic cylinders, each of which contains a charge of carbide of calcium. As soon as water touches the carbide, the sacks or pouches become filled with acetylene gas, which keeps the wearer afloat. One advantage of this contrivance is that it occupies so little space that it can be worn by a timid passenger during an entire voyage without inconvenience, and without its presence being noticed by others.

New Form of Phosphorus.

The new scarlet-red phosphorus possesses very valuable properties. It is not poisonous and is easily changed into new chemical combinations, so that it can be used for the most varied combinations. In this respect it resembles the yellow form, while as far as its nonpoisonous quality is concerned, it is like the red phosphorus. Professor Schenck, of Germany, has succeeded in making matches, using the scarlet-red phosphorus, which are not poisonous and can be ignited everywhere, so that a specially prepared friction surface, as is the case with the Swedish matches, is not required.

New Smokeless Fuel.

A French Company is about to put into practical operation a system for producing a coal, or product of coal, which will produce the best quality of heat without smoke or dust. It is claimed that the cost of this product will not be greater than the present cost of ordinary grate and stove coal. The company in question has already been able to manufacture small quantities of the new smokeless coal, and has established in one of the public galleries of the city, stoves in which exhibition fires may be seen burning daily. This new fuel is said to be made of coal dust and oil, treated by a secret process that renders it smokeless.

Soap Tree of Algeria.

German papers report that steps are being taken in Algeria to manufacture natural soap on a large scale from a tree known as "*Sapindus utilis*." This plant, which has long been known in Japan, China, and India, bears a fruit of about the size of a horse-chestnut, smooth and round. The color varies from a yellowish green to brown. The inner part is of a dark color and has an oily kernel. The tree bears fruit in its sixth year and yields from 55 to 220 pounds of fruit, which can easily be harvested in the fall. By using water or alcohol, the saponaceous ingredient of the fruit is extracted. The cost of production is said to be small, and the soap, on account of possessing no alkaline qualities, is superior to the ordinary soap of commerce.

New Process For Obtaining Zinc White.

The London Daily Mail announces that Sir William Ramsay and Prof. E. Ellershausen have succeeded in obtaining, by a new process invented by Professor Ellershausen and Mr. R. W. Western, zinc white, worth \$146 a ton from the refuse heaps of the Hafua mines in Wales. Throughout Wales there are scores of mines closed because it does not pay to work them. All these mines have miniature mountains of debris, or "tailings," at the surface. There are millions of tons of this unregarded material, which mine owners have hitherto looked upon as an unavoidable nuisance. White lead, which is regarded by scientists as a dangerous constituent of paint used in the interior of houses, frequently takes the place of zinc white. Very little zinc white is made in Great Britain. Wales found the process of making it from "spelter"—which itself costs \$102.20 per ton—too expensive to leave a fair margin of profit. Hence the present dreary succession of abandoned mines, some of them holding machinery worth many thousands of pounds. But zinc white is indispensable in certain industries: thus England imports annually from Germany, Belgium, and the United States some 200,000 tons. By the new process, the expensively obtained spelter is entirely dispensed with. The zinc white is taken direct from the ore, which costs but a tenth the sum: more, as Sir William Ramsay and the other professors showed, the very refuse of the mines can be made to yield a substantial amount of the material. From about 15 tons of the rubbish, 1 ton of zinc white can be extracted.

Magnetic Separator.

A magnetic separating apparatus has recently been patented by Thomas A. Edison, of Llewellyn Park, N. J. The object is to provide an apparatus of high efficiency, great capacity, and wherein the feed of the material to the magnetic devices, and the separation of the magnetic and non-magnetic particles, are effected by gravity and without the necessity of moving parts.

In carrying out the invention, one or more sets of magnetic separators are employed, each being in the form of an ordinary double-coil electro-magnet with extended tapering poles, one of which slightly overlaps the other to form a relatively narrow gap between them. To the upper face of the overlapping pole a continuous but thin stream of the particles moving at as slow rate as practicable is delivered, whereby the non-magnetic particles will be permitted to flow down the polar face and fall off therefrom at one side of a separating-board, while the magnetic particles will, by the lines of magnetic force, be attracted toward the other pole and will fall on the other side of said separating board. Preferably a number of such separators are used divided into two series, in the first of which the particles rejected by the first separating device will be subjected to the succeeding separators, whereby a very rough concentration will be secured, while in the second set the material concentrated by the first separator will be subjected to the succeeding separators to secure a concentrated product of high percentage.

Complete Combustion of Coal.

Sir John Primrose, at a recent banquet at Glasgow, made reference to a new process for obtaining a complete combustion of coal. He has experimented in his factories with many previous inventions of this kind in order to abate the smoke nuisance. Recently he tried a new furnace, which seems not only to prevent smoke, but permits a much greater efficiency of the coal used.

The speaker said of the invention that the burning of the coal takes place in a chamber surrounded by a water jacket, separated from the boiler, and that only the gaseous products of combustion are used for heating the boiler.

According to the new process a steamer would require less than one-half of the room now used for the boilers in order to generate the same amount of power, and the weight of the heating apparatus would also be diminished more than one-half. Air and fuel gas are conducted simultaneously to the boiler and no unburned gases can escape into the air, so that no smoke and no carbonic acid escapes through the smokestacks. For steam purposes it would also be of importance, as it is said that the process permits of the use of inferior fuel.

Manufacture of Panama Hats.

These hats are made from the common fan-shaped palm, called "palm-icha," which grows wild in abundance, generally in moderate climate and fairly moist ground. Young shoots, uniform in size, are cut from the plant and boiled to a certain stage, being softened thereby and brought to a light yellow color.

The process of boiling appears to be an art in itself, and only a few people can turn out good straw. The boilers sell the straw at so much a pound, according to quality and the prevailing prices of hats.

When the proper boiling point is reached, the shoots are put up to dry and the leaves quickly separated. This is done indoors, where there is a current of air but no sunshine. When the leaves are nearly dry, they are split with a little Y-shaped instrument of wood, so that every good leaf is the same size. When left alone to dry, the leaves curl in at the edges and are then ready for use, and at this point the straw is carefully wrapped in clean cloths, as the light and dry atmosphere spoil it. When finished, the straw is carefully pared with a pocket-knife, and then battered all over with a small hand maul, after which it is washed with common yellow soap and a little lime juice and left to dry, away from the sunlight.

In the Suaza district they make the hats on solid wooden blocks, two to four persons—generally women—sitting opposite each other and working steadily. Four women can make an average quality hat in six or seven days, while a fine one requires three to six weeks.

The hats made in the Suaza district in Colombia are considered much superior to those made in Ecuador. About a year ago an average Suaza

hat cost about 45 cents first hand, a good one \$1.50, and a very fine one \$3; but prices have varied according to the demand and during the last two years they have been rising steadily, and now, at times, as high as \$5 and \$6 is paid for them—and not the very finest at that.

The manufacture of these hats is affected, to a great degree, by climatic influences, an expert hatter being unable to make as good a hat in the dry summer weather as during the rainy season: probably on this account hats in some parts of the Suaza district are superior to those made just a short distance away. Long training is necessary to become a good hatter, and the girls are started at the work at the very early age of 10 years and must practice constantly.

The Electric Furnace for Glass Making.

One of the more recent applications of the electric furnace is in the manufacture of glass, a process which entails considerable expenditure of heat and a comparatively clean source for the latter, such that no impurities in the shape of combustion products shall enter into the fused mass and destroy the purity and transparency of the finished article. Nernst's discoveries in connection with earths that become electric conductors when heated to a certain degree, have an important bearing on the development of this industry, in that glass itself may be numbered among those substances: molten glass is, in point of fact, an electrolyte, and thus lends itself readily to electric furnace methods of manufacture.

One of the earliest electric furnaces for glass making was patented in Germany in 1882. It was of the resistance type, and consisted essentially of a carbon crucible, open at the base, and lined internally with a net or bag of platinum wire. The raw material was fed into this, and having been fused by the heat developed in the carbon walls, dripped through into refining vessels placed underneath.

A later German furnace is a combination of the arc and resistance principles of electric heating. The furnace consists of three parts, the upper portion being utilized as an arc furnace for melting the raw materials, and the intermediate part as a resistance furnace for a species of refining process which the molten mass subsequently undergoes before it finally overflows into a lower receptacle or trough.

In still another furnace, also of German origin, the raw material in the form of powder, is mixed with a suitable binding substance, such as water-glass, hydraulic lime, or plaster, which will not affect the transparency of purity of the resultant glass. The mixture is fed down a chute to rollers between which it passes, and is thereby transformed into a continuous and homogeneous sheet or rod, as the case may be, the particles being held together by the water-glass or lime before mentioned. It next passes over a heated roll which drives off all moisture, and finally emerges on the upper extremity of an inclined plane forming the hearth or floor of the furnace. Down this it travels at a regular rate, dependent upon the speed of fusion and consequent glass formation, passing for that purpose under electric arcs playing between suitably placed electrodes, or, if in rod form, traveling down the hearth in like manner between opposite pairs of arc electrodes.—*Cassier's Magazine*.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE. This keeps inventors and manufacturers posted in the art in which they are most interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy; twenty copies \$1.50.—Please give correct data in ordering.—Address,

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Electric circuit plug receptacle.....J. H. Trumbull
Electric heater.....G. I. Leonard
Electric heater and battery. Combined.....J. R. Davis
Electric light bracket.....2 pats.....T. Smith
Electric lighting. Regulating apparatus for theatrical.....E. F. Moy et al
Electric machine. Dynamo.....L. Wilson
Electric machine or motor. Dynamo.....I. E. Storey
Electric separator.....A. H. Perry
Electric switch.....M. von Recklinghausen
Electric switch.....E. R. Dull
Electric wire coupling.....R. G. Castillo
Electric wires. Universal floor box for the distribution of.....J. Fountain, Jr
Electrical furnace.....R. M. Pelton
Electrical resistance.....G. I. Leonard
Elevator hatchways. Automatic closure for.....J. W. McGhee
End gate.....O. B. Reynolds
Engine.....W. D. Edwards
Engine.....F. M. Overholt
Engine.....W. K. L. Dickson et al
Engraving machine. Automatic.....M. Barr
Engraving machine. Pantograph.....M. Barr
Exercising apparatus. Elastic.....T. Belvoir
Extension table.....H. Johnson
Extension wrench. Tap and reamer.....G. L. P. Combs
Eyeglass frame.....P. Lafortune
Eyeglass lens attachment.....R. Tatum
Eyeglasses.....P. Moews
Fan and score card.....F. S. H. Johnson
Fan guard.....C. F. Finch
Fare register.....F. J. Hull
Feed. Boiler.....F. E. Keyes
Fence.....S. N. Soper
Fence post.....C. Colvin
Fence post.....S. Fielder
Fence post. Cement.....H. P. Ewell
Fence tie. Wire.....O. S. Sturtevant
Fencing. Wire.....J. Harris
Filter and making same.....J. G. Woolworth
Filter. Rain spout.....A. G. Moekel
Finger pad.....J. G. Marsh
Fishing rod.....H. W. Buschemeyer
Fishing tackle.....W. W. Shulean
Flask connection.....J. Cunningham
Flier.....F. H. Martin
Flue or duct.....H. H. Laws
Flue scraper.....W. Appenbrink
Fluid pressure brake.....W. V. Turner et al
Food chopper.....C. F. Smith
Foot rest and pedal extension.....A. M. Bates
Fruit gatherer.....J. Wilson
Funnel.....M. Hunter
Furnace feeding plant. Metallurgical.....A. P. Gaines et al
Furniture. Fastening device for detachable parts of.....A. Hausske
Fuse. Percussion.....H. Wilson et al
Gage.....A. Basola
Game.....L. M. Dieterich
Gas furnace. Regenerative.....F. Siemens
Gas making machine. Gasolene.....C. A. Anderson et al
Gas purifier cover.....P. J. Nolan
Gate door &c. joint.....J. Stevens
Gin saw cleaner.....G. J. & R. M. Jordan
Glass articles. Manufacturing hollow.....S. O. Richardson, Jr
Glass. Grinding.....C. C. Stutz
Glass or earthenware vessel.....J. C. Howells Sr
Glass. Ornamental.....C. S. Dolley
Glove.....H. Hartmann
Golf club.....H. B. Smith
Governor.....E. A. Page
Governor. Engine.....C. Andrews
Grading and ditching machine.....J. W. Baker
Gun. Trap.....I. N. Thomas
Handle and socket.....R. D. Gallagher, Sr
Harness attachment.....F. W. Atwell
Harvester tongue truck.....S. K. Dennis
Hat.....J. Taylor
Hat frame forming device.....2 pats.....E. A. Howe
Hat pin.....A. A. McRae
Hay press.....A. H. & L. C. O'Quinn
Hay rake.....H. M. Kamer
Heater.....B. I. Mahon
Hinge.....R. W. Hubbard
Hoist and power device. Intermittent.....A. M. Smith
Hoisting and conveying apparatus.....F. N. Wedge
Holdback.....A. E. Handy
Horseshoe machine.....J. Dahlstrom
Hose supporter.....A. H. Benjamin
Hosiery singeing apparatus reissue.....R. Meyer
Hub dust guard. Vehicle.....W. H. Little
Hub. Wheel.....J. Rosenberg
Hydrocarbon burner.....J. L. Hague
Identification device.....H. Conley
Illuminating and advertising device.....F. De Mare
Incandescent mantle and manufacturing same.....W. K. L. Dickson
Index rod locking device. Card.....C. A. Weidner
Inhaler.....J. O. A. Haughey
Ironing apparatus.....K. Rutherford
Jack.....J. R. Armstrong
Journal bearing.....M. F. Stadtmuller
Key fastener.....W. F. Kentoff
Key fastener.....A. C. Pickard
Kneading machine. Dough.....L. Durand
Knitting machine. Circular.....W. Stafford et al
Knob. Furniture.....E. W. Bassick
Knockdown box.....C. A. Beems
Lacer for shoes. Temporary.....E. E. Donovan et al
Ladder. Scaffold.....H. B. Oursler
Lamp base. Incandescent.....H. Gilmore
Lamp cluster. Electric.....2 pats.....R. B. Benjamin
Lamp. Electric arc.....O. Gross
Lamp socket. Plural 2 pats.....R. B. Benjamin
Lamp steadying resistance. Arc.....L. Wolff
Last.....A. H. Brigham et al
Lathe tool holder.....F. H. Sandherr
Leather bleaching apparatus.....E. C. Amidon
Leather skiving machine.....J. R. Scott
Ledger.....H. L. Hall
Limb. Artificial.....W. T. Carnes
Liquid cooling apparatus.....G. F. Black
Liquid fuel burner.....A. E. Johnstone
Logging car chain release.....R. J. Thompson
Loom. Filling replenishing.....A. E. Benson
Loom harness mechanism.....P. C. Schwemmer et al
Looms. Combined box motion and protection rod lever for.....W. Leary
Lubricator.....A. Byington
Mail bag catcher.....G. J. Boget
Mail bag catching and delivering device.....W. T. Fulton
Mail bag fastening.....C. B. Stevens
Mail catcher and deliverer.....H. N. Fleming
Mail catcher and projector.....L. A. Pease et al
Map case. Wall.....R. M. Ringland et al
Marble or granite polishing machines. Head for.....H. J. Higgins
Match igniting device.....F. W. Tuerk
Match making machine.....W. S. Campbell et al
Match safe.....J. H. Millsaps
Matting.....A. S. Burnell
Measuring and filling machine. Automatic.....H. Smith
Meat tenderer and vegetable cutter.....M. Knutsen
Meats. Curing and preserving.....A. W. Ball
Medicated soaps. Making.....R. Reiss et al
Metal fabric or matting.....F. C. Sparks
Metal plates. Device for connecting.....G. W. Edwards
Metal upsetting machine.....H. V. Loss
Metals. Apparatus for the electrolytic refining of.....A. Schwarz
Meter register.....W. H. Larrabee
Metronome regulator.....J. H. Morrisette
Miter box.....J. W. Beaman
Molder's flask.....C. Phelps
Moving machine crop gathering and discharging attachment.....W. N. Whitely
Music rack.....A. Belding
Musical instrument.....F. Sudre
Musical instrument.....R. A. Wilkins
Nail drawer.....J. M. Marty
Negatives and printing plates. Apparatus for treating.....W. G. Thorpe
Nut. Lock.....A. Louman
Oil cellar.....A. L. Turnipseed
Oil switch. Automatic.....M. von Recklinghausen
Oil switch. Quick break.....M. von Recklinghausen
Oiler. Axle.....J. C. Lambert
Oiler or oil can.....H. M. Edwards et al
Ordnance breech mechanism.....J. W. Stockett
Organ valve. Pneumatic.....W. E. Haskell
Organs. Pneumatic coupler for pipe or reed.....W. E. Haskell
Packing device for turbine shafts.....J. Wilkinson
Packing. Self-adjusting polish rod.....D. Crocker
Paper bag machine.....J. P. Onderdonk
Paper bookwise. Device for holding loose or removable sheets of.....R. G. Whitlock
Paper cabinet. Toilet.....A. H. Scott
Paper feeding machine sheet registering means.....T. C. Dexter et al
Paper holder. Toilet.....R. B. Friend
Paper machine.....R. S. Case
Paper making machine. Carbon.....F. B. How
Paper punch or perforator.....C. C. Boykin
Pavements. Preparing compositions for and heating and laying bituminous.....J. H. Amies
Pedal driving apparatus.....W. S. Steljes
Peeling machine. Tomato.....W. Archdeacon
Pen. Dotting.....E. G. Ruehle
Penholder.....S. H. Hodges
Pen shield.....S. H. Hodges
Perch. Fowl.....J. Maes
Peroxids. Manufacturing.....F. Hinz
Piano action.....T. Beyer
Pharmaceutical dispensing case.....E. J. Thurman
Pipe bending machine.....J. J. Tynan et al
Pipe cutter.....R. A. Jackson
Plane. Hand.....W. E. Lee
Planter. Corn.....J. W. White
Planter. Seed.....E. M. Heylman
Plow.....J. Roach et al
Plow.....G. D. Franklow
Plow standard.....G. C. Brown
Polishing disk.....A. Racicot et al
Portable house.....A. Miller
Post.....D. Warner
Potato digger.....W. J. Symonds
Power transmission device.....W. Evans et al
Power transmission device.....C. Smith et al
Printing machine.....G. W. Swift, Jr
Printing pattern cards for weaving. Machine for.....G. Noack
Printing plate and making same.....A. Scheckner
Printing plate holding device.....W. S. Timmis
Printing press attachment.....C. S. Inskeep
Printing press. Multicolor.....B. J. Such
Projectile.....E. L. Kwiatkowski
Projectiles, &c. Carrier or conveyor for.....C. P. E. Schneider
Pulley. Lubricating.....A. N. & C. B. Borquist
Pulverizer, breaker, or disintegrator.....G. W. Borton
Pulverizing mill.....M. Benjamin
Pump.....A. D. Elliott
Pump rod counterbalance.....R. R. Smith
Pump valve.....A. Choiniere
Purifying apparatus.....P. J. Boucher
Puttying tool.....W. T. Selley
Puzzle.....A. L. Snedeker
Rail joint.....J. R. Oakley
Rail joint.....G. Schmidt
Rail joint.....K. Kraus
Rail joint.....E. H. Tuttle
Rails, shafts, &c. Coupling device for.....C. A. A. Chenu
Railroading system.....J. T. Richards
Railway. Electric.....T. D. Lovell
Railway. Electric.....W. R. Fearn
Railway frog.....J. N. Wolfinger
Railway rail. Reversible.....W. S. Corpmann
Railway rail stay.....E. Laas et al
Railway switch.....W. S. Boyd, 3d
Railway switch lock. Automatic.....C. Sulfer
Railway tie.....E. A. Jacoby
Railway tie. Concrete.....L. & M. J. Beezer
Ratchet mechanism.....P. A. Houghaling
Retort.....L. H. Hague
Reversing mechanism.....H. Gansert
Rice polishing machine.....R. W. Welch
Rivet routing tool.....J. W. Robinson
Rod or wire reeling or coiling device.....V. E. Edwards
Rolling mill.....J. R. George
Rotary explosive engine.....D. V. Bagwell
Rotary screen.....F. A. & E. A. Bonham
Rubber tread reissue.....R. E. Foster
Rug attachment.....S. Gulian
Ruling machine.....J. H. Reinhardt
Safety pin.....C. Andresen
Safety pin.....J. H. Harris
Sandpapering machine.....N. P. Collis
Sandpapering machine.....D. V. Hodd
Sash, &c. fastener.....N. Rodney
Sash holder.....J. M. Bailey
Saw.....W. H. Batchelder
Saw guide. Universally adjustable.....H. H. Venable
Saw set.....W. McGhie
Saw side tooth dresser.....J. Hargreaves
Scaffold Painter's.....R. W. & A. J. Weeks
Scale. Automatic balance.....P. A. Depaepe
Scale indicating attachment. Platform.....F. W. & W. H. Smith
Sewing cabinet.....O. Yates
Shade roller spring mechanism.....W. D. Harned
Shears.....H. C. Heinisch
Sheet registering means.....T. C. Dexter
Shell filling machine.....H. M. Pierce
Shingle machine.....A. B. Cummins
Shipping card receptacle.....W. S. Callery et al
Shirt bosom. Supplemental.....H. C. Nelson
Shoe paste dauber.....W. Church
Shutter fastener.....H. N. Mattson
Sifter.....H. F. Cohn, Jr
Signal system. Automatic pneumatic.....H. T. Farnsworth
Signal system. Selective.....F. C. Penfield et al
Sink strainer.....W. Dicks
Slag furnace.....R. Baggaley et al
Slate.....C. E. Johnson
Sleigh.....F. B. McNamee
Smelting materials. Electrically.....A. H. Cowles
Speed transmission device. Variable.....W. Evans et al
Spinning machine. Rotary ring.....A. T. & C. T. Atherton
Sprinkler or minimizer.....R. B. Adams
Square. Try.....C. E. Smith
Stacker. Hay.....W. Fagan
Stacker. Hay.....O. D. Stalcup
Stamp. Cancellation.....J. H. Montgomery
Steam boiler.....G. W. Ingham
Steam exhaust head or muffler.....J. Bonar
Steam generator.....J. B. Beam
Stereographic mounting frame.....H. C. & H. C. White
Stereotype or electrotype plates. Evening the faces of.....M. A. McKee
Stoker. Mechanical.....J. J. Burwell
Stone. Manufacturing artificial.....L. Chase
Stool. Folding.....A. M. Schultz
Stove attachment.....W. G. Shoals
Stove. Heating.....T. A. Doughty
Striking bag.....A. Lindsay
Stuffing box.....A. L. Dudley
Surgical instrument.....T. A. Houghton
Suspenders.....H. T. Hazard
Switch.....I. F. Harris
Switchboard. Electrical.....E. W. Muller
Switch indicator. Automatic.....D. S. Rice
Switch stand.....J. G. Waterston et al
Syringe. Subcutaneous.....L. Reich
Table locking device. Pedestal.....C. S. Burton
Tablet. Writing.....A. P. Jones

- Tag for merchandise, Price W. Mills, Jr., et al
Taps, dies, &c. Machine for forming C. Berry
Target, Electric self registering T. F. Oetjen
Telegraph apparatus, Facsimile E. K. Gruhn
Telegraph sounder..... J. F. Skirrow
Telephone currents. Apparatus for amplifying or reinforcing..... J. J. O'Connell
Tellurian..... P. D. Lawlor
Tent..... E. A. Chase
Textile fabrics, Steaming and drying machine for..... J. W. Fries
Thill iron..... L. Husser
Thill or pole coupling..... J. E. Ackerman
Ticket, Differential commutation..... G. H. Sargent
Time recorder..... A. N. Palmer
Tire..... J. Snyder
Tire guard, Pneumatic T. L. & T. J. Sturtevant
Tire, Vehicle..... L. G. Nilson
Tire, Vehicle..... T. M. Arnold
Tire, Vehicle wheel..... C. J. Pigeon
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Tobacco box and cutter, Combined..... J. A. Hill
Tool, Fluid pressure impact..... C. R. Green
Tool handle..... T. A. Weston
Tool, Pneumatic..... R. W. Funk
Tools, Electrical apparatus for working reciprocating..... A. D. Williamson et al
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Trolley..... F. A. Overdier
Trolley base..... P. D. Milloy
Trolley catcher..... I. W. Smith
Trolley pole..... J. Furgason
Trolley pole head..... R. I. E. Dunn
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Trousers press..... G. F. Rooney
Trousers press..... E. Graham
Truck..... P. Grabler
Truck, Maximum traction, 2 pats..... J. A. Brill
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Truck, Maximum traction car..... W. S. Adams
Truck, Railway car..... A. K. Mansfield et al
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Truss..... J. E. Lee
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Tubes, &c. Machine for glazing..... J. Conde
Tubular articles, Making..... L. Feval
Tufting tool..... W. H. Lawson
Tumbler or rattle barrel..... A. J. Thomas
Tunnel construction..... D. Phillips
Turbine, Elastic fluid..... C. G. Curtis
Turbine regulator, Elastic fluid..... T. G. E. Lindmark
Turbine, Steam, 3 pats..... J. Stumpf
Type writer ribbons, Machine for making..... F. B. How
Type writing machine..... W. S. Hallock
Type writing machine..... M. J. Ettinger
Type writing machine ribbon shield..... W. C. Baker
Unbroken main line switch 2 pats G. M. Ervin
Valve action, Explosive engine..... O. C. Duryea et al
Valve gear, Explosive engine..... F. Hardenbrook et al
Valve mechanism, Engine..... B. Botkowski
Valve, Steam actuated..... A. J. Holmberg
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Vase..... W. Peterson
Vehicle body..... L. G. Nilson
Vehicle chafe iron..... J. P. Baird
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Vehicle running gear, Motor driven..... B. C. Hicks
Vehicle top..... W. H. Zehner
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Vending and delivery machine..... A. C. Estberg
Ventilating device..... S. E. Chapman et al
Ventilator..... F. H. Hitchcock
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Vibrator, Pneumatic..... H. Tonjes
Violin..... B. Battram
Violin attachment..... S. E. Griswold
Voting machine key..... T. Cory
Wagon brake..... O. W. & A. L. Warner
Wagon, Lumber..... D. W. Strickland
Waist for infants, Napkin supporting..... J. H. Harris
Washing machine..... C. W. Hottman
Watch holder, Safety..... J. H. Bee et al
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Water heater..... J. M. Fox
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Water heater, Electric..... R. Toennes
Water tube boiler..... J. P. Sneddon
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Weaving purposes, Production of endless cards for..... J. Szczepanik
Wedge..... A. A. Eich
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Weighing apparatus, Automatic..... T. H. Rolfe
Well heater, Oil..... J. C. Butler
Wells, Device for extracting rods, &c., from..... J. Lisle
Wheel..... G. W. Lovejoy
Wheel, 2 pats..... A. J. Robertson
Wheel securing device..... E. S. Abbott
Window, Horizontally pivoted J. E. McGinness
Window screen..... T. A. Foust et al
Wire straightener..... J. A. Gregersen
Wire stretcher..... D. S. Durall
Wood preserving composition..... W. B. Taylor
Woodworking machine attachment..... F. M. Gelvin
Wrapping machine..... A. Bayler
Wrench..... D. R. Ellis
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- DESIGNS.**
Cup..... G. F. Kolb
Display tray, Candy..... F. H. Roberts
Lavatory..... T. J. Torrance
Pin head, Hat..... W. Turton
Safe or vault body..... W. Brinton et al
Spoons, forks, or similar articles, Handle for..... J. E. Straker, Jr
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- MECHANICAL PATENTS.**
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Aerial navigation apparatus..... C. F. Morrison
Air brake hose coupling..... A. F. Allan et al
Alarm mechanism..... A. T. Cunningham
Alcohol, Making..... S. J. Vance
Alkaline silicate solutions, Evaporating..... C. Reim
Aluminium sulfid and alloys, Manufacture of..... M. Onda
Amusement apparatus..... A. F. Mueller
Animal trap..... A. E. Huguley
Annealing apparatus..... E. A. Uehling
Ashes or garbage receptacle..... M. A. Donohue
Automatic brake..... L. F. Weebur
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Bag frame handle..... E. E. Witte
Bag holder..... A. M. Harris
Basket making machine..... E. Horton
Bath..... E. W. Lancaster
Bathing apparatus, Electrical..... R. S. Lawrence
Battery plate, Storage..... E. W. Smith
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Bead loom..... F. C. Poole
Bearing, Roller..... W. S. Wood et al
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Beer or water cooler..... R. S. Wiesenfeld
Beet topper, digger, and screener, Sugar..... I. Bentley
Belt, Rubber..... J. W. Rodgett
Belt sanding machine dust hood C. S. Yarnell
Belts, Automatic gripper for conveyer..... J. J. Ridgway
Binder, Loose leaf..... C. R. Nelson
Biscuit stamping and cutting machine..... T. & J. Vicars, Jr
Blank, Negotiable instrument..... P. S. Nagle
Blow out chute..... F. B. Corey
Bobbin and spindle connector..... F. W. Saworski
Boiler..... J. C. Beckley
Boiler tube..... J. A. Niclausse
Bolster spring crank plate..... G. B. Freeman
Bolt and nut lock..... W. H. Smith
Bolt turning head..... B. D. Jackson
Bomb..... G. Supnick
Bottle corking machine..... J. F. Schneider
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Brake beam..... C. F. Huttoon
Brake beam fulcrum post..... W. E. Sharp
Brake slack adjuster..... F. L. Clark
Brick drier..... J. W. Aregood
Brick or stone mold, Solid..... J. P. Oosting
Broiler..... C. B. Daniel
Brush handle..... H. A. Hayden
Brushes of loose bristles, Machine for freeing..... M. P. Tottle et al
Buckle and cockeye, Combined..... F. W. Hawes
Building block..... F. W. Blakeslee
Building block mold..... L. O. Burnham
Building construction..... A. Haag
Burial apparatus..... W. J. Barrett
Burnishing machine..... P. Duplessis
Button carding machine..... A. J. Meitz
Calipers or dividers..... F. H. Cawley
Call box..... J. C. Barclay
Camera, Photographic..... J. E. Thornton
Car coupling knuckle..... D. W. Alderman
Car door..... R. Mobley
Car draft gear, Railway..... W. F. Richards
Car fender..... P. B. Sullivan et al
Car fender..... J. C. Cooper
Car fender..... J. Derr
Car friction draft rigging, Railway..... F. B. Townsend
Car gate, Automatic..... W. N. Hackett
Car heating system, reissue..... E. H. Gold
Car loading mechanism..... F. R. Willson, Jr
Car, Motor..... A. Palmros
Car, Railway..... J. H. Bruce
Car running board, Railway..... M. S. Nolan
Car stanchion..... F. J. Buzbee
Car step folding extension..... C. K. Turley
Car step, Supplemental..... E. Howe
Car ventilator..... R. S. Lawrence
Car wheel..... J. E. Downer
Car wheels, Manufacturing..... W. E. Connolly et al
Car wheels, trucks, &c. Apparatus for removing..... W. A. Haller
Card clothing to cylinders, Machine for applying..... C. Mills
Carriage top..... L. C. Shipley
Cart, Tank..... T. D. Ulrich
Cash indicator and register..... F. M. Boring
Cash register attachment..... J. Schineller
Cash register signal..... W. F. Bockhoff
Casting machine, Metal..... E. Crossley
Cement brick machine..... J. D. Luttrell et al
Chain..... 4 pats..... I. M. Dodge
Checks, Lock stub for sale..... R. Woodman
Chimney canopy top..... G. H. Huse
Churn..... J. W. Newton
Churn vent..... C. F. Lancaster et al
Chute and bag support for vehicles..... C. W. Lanpher
Cigarette mouthpiece blanks, Mechanism for attaching fibrous material to..... A. A. Drutschenkov
Circuit breaker..... C. F. Stoddard
Circuit breaker..... J. Burry
Circuit breaker..... A. C. Miller
Cistern forming device..... W. McNeil
Clock striking mechanism, Electric..... E. Meyer
Closet connection..... D. Keohane
Closet joint..... W. E. Hinsdale
Clothes line reel and stretcher..... A. E. Hall
Clutch..... W. S. Timmis
Clutch, Friction..... H. Baumgartner et al
Clutch mechanism..... S. D. Sprong
Coaling apparatus, Boat..... H. D. Stearns
Coaster brake..... J. Zimmerman
Cock, Bib..... H. F. Schroeder
Coin actuated mechanism..... S. Aronson
Coin controlled apparatus..... A. E. Wells
Collapsible box..... C. H. Stonebridge
Collar fastener, Horse..... S. O. Sheldon et al
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Collar, Horse..... reissue..... A. G. Couch
Comb..... A. F. Mott
Compound fabric..... F. B. Uebel
Concrete molding apparatus..... G. M. Graham
Conveyer..... T. S. Miller
Conveyer..... W. J. Patterson
Conveyer..... E. Crossley
Conveying apparatus clamp..... G. A. Amsden
Copy holder..... M. L. McAloney
Copying press..... H. F. Searles
Cord adjuster..... H. E. E. Strunk
Cord making machine, Covered..... W. Meyer
Core molding apparatus, Sand..... J. E. Price
Cork extractor..... M. D. Pollock
Corn popping apparatus..... J. B. Bartholomew
Corn shredding machine self feeder..... B. McAdams
Corn stripper and husker, Combined..... E. W. Miller
Cotton boll weevils, Machine for destroying..... F. Riewe
Cotton bundle tie..... G. L. Edgerton
Cotton elevator and gin feeder..... B. D. Sory
Cotton picker..... W. Bennie
Coupling pins, &c. Machine for making..... J. F. Lober
Cover, Pot..... C. H. Pickett
Crackers, Machine for separating and assembling..... W. H. Budd, Jr
Crate or box, Folding..... W. H. Beckett
Cultivator, Single row..... J. E. Bieler
Current transformation, Alternating..... M. Hutin et al
Curtain fixture..... N. Ziegler et al
Cuspidor, Car..... R. T. Cummins et al
Cutting board..... C. H. Farmer
Cyanids, Apparatus for manufacturing..... J. A. Kendall
Decoy duck..... J. Coundon
Dental manikin..... E. P. Wright
Derrick..... A. E. Parker
Dish washing machine..... C. S. Chamberlain
Display box, Neckwear..... W. R. Delaney
Display rack for umbrellas, &c..... F. H. Hohoff
Door chaker, Sliding..... W. H. Taylor
Door fastener..... W. Box
Door or gate opening or closing device..... J. F. Connell
Door securer..... W. Stamp
Door stop..... C. C. Davies
Drawing press..... J. J. Rigby
Drier..... 2 pats..... L. Gathmann
Drill..... C. W. Crossman
Driving mechanism..... F. D. Howe
Drop light..... 2 pats..... E. E. Grove
Dumping rake..... E. Walrath
Dust pan..... C. Michaud
Egg case tray or filler..... F. F. Bischoff
Electric apparatus, Gas or vapor..... M. von Recklinghausen
Electric circuits, Controlling means for..... J. K. Lux
Electric currents, Means for controlling..... I. Deutsch
Electric currents, Means for safely conducting..... E. A. Jarvis
Electric generators, Automatic regulator for..... W. A. Turbayne
Electric generators, Automatic regulator for..... M. R. Shedd
Electric indicator..... F. Sadler
Electric pole changer..... C. E. Scribner
Electric switch..... H. P. Ball
Electric switch..... F. Stevens
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Electrically controlled switch..... W. H. Hillyer
Electrodes for batteries, Manufacturing hard porous..... H. P. R. L. Porsche et al
Elevator..... J. J. Schwob
Embroidering machine..... G. L. Bourquin et al
Emery wheel..... J. W. Clarke
Engine cooling device, Internal combustion..... A. J. Fisher
Engine mixer and governor, Gas L. H. Nash
Engine speed regulator, Explosive..... C. O. Lucas
Engine vaporizer, Explosive..... M. C. White et al
Envelope..... C. A. Meadows
Evaporating or distilling apparatus..... J. S. Forbes
Excavator..... V. P. Keller
Exhibition of series of objects, Device for the automatic..... D. Strumpf
Explosive engine, Quadruple four cycle..... F. E. Schoonmaker
Extension table..... D. F. Oliver
Extension table..... J. Ingalls
Eyeglass holder..... C. W. Conner
Eyeletting machine..... A. Dewes
Fan attachment..... J. W. Tatum
Fan, Folding..... F. Helm
Fan motor support..... E. P. Warder
Fare register..... N. B. Hughes
Feather treating machines, Stop motion for bed..... H. Bauer
Feed regulator, Automatic..... E. R. Draver
Feeder, Time stock..... J. R. Ray et al
Feeding device..... W. Francis et al
Fence post..... S. Witt
Fence post molding apparatus, Concrete..... G. M. Graham
Fences, Compensation spring for wire..... A. E. Bailey
File, Bill..... E. Smith
Filing drawer..... T. Carney et al
Filter..... P. Danckwardt
Filter..... W. B. Klein
Fire partition..... J. W. Reno
Fluid compressor, Elastic..... H. Bland
Fluid pressure brake..... H. R. Mason
Fluid viscosity motor or turbine..... B. J. Campbell
Flush tank..... J. F. Cunningham
Flux for soldering aluminium..... C. Ellis
Food cutter..... G. A. Colton
Food warmer..... W. S. & L. C. Bonsall
Furnace attachment..... T. J. March
Furnace grate for smokeless combustion..... F. Girtanner
Furnaces, Means for supplying oxygen to..... F. H. Patrick
Furnaces, Method of avoiding loss of heat in..... A. Kurzwehnart
Garment hook..... W. F. Peet
Garment supporter..... H. N. Northrop
Garment supporter..... I. B. Loos
Gas bench retorts, Platform used in charging or discharging..... K. M. Mitchell
Gas burner, Incandescent..... A. J. Simpson, Jr
Gas engine..... W. M. Jewell
Gas generator..... W. F. Mattes
Gas generator, Acetylene..... P. C. Avery
Gas igniting appliance..... D. & W. M. Taylor
Gas light extinguisher, Time..... P. E. Newsom
Gas lighter, Electrochemical..... I. Rothstein
Gas meter, Prepayment..... S. Aronson
Gas or liquid supply pipes, Cut off apparatus for..... F. W. A. Wiesebeck
Gas purifier..... P. Winand
Gate..... J. C. Dysart
Gate opening or closing apparatus, Automatic..... W. H. Houdlette
Gear, Variable speed..... W. T. Leighton
Girder and joist connection for posts..... A. S. Alschuler et al
Glass bending apparatus..... T. W. Conington
Glass forming machine, Sheet..... 2 pats..... R. A. B. Walsh
Glass, Grinding..... C. C. Stutz
Glass in store fronts and show cases, Fastening for plate..... W. L. Kann et al
Glove..... D. F. Morgan
Gold washing machine..... C. C. Van der Valk
Governor, Engine..... J. W. Sargent
Governor, Engine..... W. Trinks
Governor, Explosive engine..... A. Sanander
Grading machine..... E. J. Vodra
Grain cleaner..... W. Williamson
Grain dump, Portable..... S. Guth
Grain separator..... J. E. Mitchell
Gramophone record plate..... T. B. Birbaum
Granular material, Apparatus for supplying..... A. L. & O. Anderson
Grenade, Hand..... S. S. Connor
Grinding machine, Cutter..... E. Schroeder
Grinding machine, Disk..... C. A. Machin
Grinding mill..... G. C. Prenzel
Grinding mill..... F. Mueller
Gun extracting apparatus..... W. A. Lawrence
Gun locking block, Automatic..... T. C. Johnson
Harness attachment..... J. R. Wilson
Harrow, Disk..... S. V. Kennedy et al
Harrow or cultivator..... O. C. Cutter
Harrow truck, Disk..... C. S. Sharp
Harvester, Beet..... J. W. Arthur
Harvester bundle carrier, Corn..... H. J. Case
Harvester, Corn..... J. F. Smith
Harvester crop gathering and discharging attachment..... W. N. Whitely
Harvester grain divider..... 2 pats..... S. V. Kennedy et al
Hat case, Combination..... H. Hefty
Hat fastener..... A. Alber
Heel building machine..... W. Wolfe
Hinge..... G. T. Mackinder
Hoisting mechanism..... P. Mullen
Hook..... T. J. Browning
Horseshoe..... W. E. Sandifer
Horseshoe attachment..... J. Griffin
Horseshoe calk..... J. H. Vinton
Horseshoe pad..... M. Marson
Hose coupling..... J. E. Simpson
Hose coupling..... R. M. Dixon
Hose puller and wringer..... J. A. Britton
Hot water boiler..... C. Gaebler
Hub, Motor vehicle..... E. P. Cowles
Hydraulic press..... H. O. Westmark
Hydraulic press..... P. W. Fuller
Hydrocarbon burner..... A. C. Rush
Hydrocarbon burner..... J. G. Camp
Ice planer, Elevator..... J. G. Bodenstein
Ice planer, Field..... J. G. Bodenstein
Incandescent light mantles, Machine for cutting..... J. A. Russell
Incandescent mantle support..... A. N. Spooner
Indigo and making same, Chlorinated..... P. E. Oberreit
Indigoes, Discharging halogen..... A. J. Stiegelmann et al
Injector, Water pressure..... J. H. Venners
Insect guard..... W. Humans
Insulation for transformer coils C. L. Fortescue
Insulator for mechanical elements, Articulating device for..... H. Brammer
Journal box, Car..... J. Pearson
Journal box lid..... J. L. Mohun
Key chain and locket, Combined..... C. Arnold
Kiln..... W. Sutton
Knitting machine stop motion..... G. A. Landenberger
Lace, ribbon, braid or cord holder, Adjustable..... M. C. Cantrell
Lamp chimney..... J. S. Newlin
Lamp, Electric incandescing..... F. M. F. Cazin
Lamp, Hydrocarbon..... C. Perillat
Lamp, Hydrocarbon incandescing..... 3 pats..... G. Washington
Lamp manufacture, Vapor electric..... P. C. Hewitt
Lamp, Portable electric hand..... G. Stein
Lantern hook..... B. P. Gibbs
Leather seasoning machine..... R. D. Scott
Letter sheet and envelop, Combined..... E. A. Christoph
Level..... J. A. Traut
Level and plumb..... A. J. Patterson
Level, Artist's..... A. K. Cross
Light extinguisher, Time..... W. J. Brown
Lister, Double..... I. J. Kaar
Lister, Three wheeled riding..... D. M. Fry
Lock..... F. S. Aliano
Lock cover..... I. Weisnek
Log carriage cushion..... H. G. Dittbenner
Logging system, Cable..... J. N. Hornblower
Loom filling carrier, Feeder..... O. E. Holdridge
Loom, Filing replenishing..... E. S. Wood
Loom lug strap holder..... W. Donner
Loom picker check..... R. Jamieson
Loom pile wire sharpener..... W. Tunstall
Loom shuttle check..... W. Simms
Loom take up mechanism, Narrow ware..... E. H. Ryon
Loom temple..... R. P. Pearson
Lubricator..... A. Erbor
Lubricator..... H. L. Kinch
Mail and package carrying device, Electric..... E. G. Hamilton
Mail bag catching and delivering apparatus..... C. W. Murdock
Malting roller..... F. Reypens De Schutter
Mangle..... J. W. Durr
Manifolding blank..... H. P. Brown
Manifolding tablet..... H. P. Brown
Manure loader..... J. H. Entrekun
Match lighter..... P. J. A. Schnoor
Measuring device, Garment..... A. D'Alessio
Measuring instrument..... P. H. Walsh
Measuring instrument, Distance..... R. J. Miller
Meat chopper wrench..... A. J. Gerhardt
Metal melting furnace..... J. Southern
Metal pump, Molten..... B. B. Hough

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MECHANICAL PATENTS.

Accordian..... R. Carbonari
Aerial navigation apparatus..... C. F. Morrison

Metal turning device..... C. Thoma
Metals from ores or sands. Recovering..... W. J. & J. H. Jory
Milk jar closure or cap..... D. P. Moore
Mining machine..... F. L. Sessions et al
Mirror..... M. T. Goldsmith
Mirror and support therefor..... W. F. Obermiller
Mirror lock..... A. E. Huguley
Miter box..... J. J. Harris
Miter box..... W. H. Gordon
Mold..... E. Campbell
Mower attachment, Lawn..... W. H. Ogden
Mower, Lawn..... H. W. Leavitt
Mowing machine..... S. D. Maddin
Mowing machine..... C. S. Sharp
Muffle kiln, Continuous..... T. S. Nickerson
Nail puller..... G. Walker
Needle threader..... M. L. Crannell
Nickel carbonyl. Manufacture of..... J. Dewar
Nippers, Cutting..... L. Roberts
Nut lock..... J. W. Scanland
Oil bailing device..... A. L. Shellhammer
Oil burner..... G. B. von Boden et al
Oil burner, Hydrocarbon..... L. J. Strait
Oil switch..... H. P. Ball
Oil switch, High tension..... H. P. Ball
Ophthalmic cabinet..... L. C. Lawall
Ophthalmometer..... J. E. Chambers
Ore roasting furnace, 2 pats..... W. H. Smyth
Ore treating furnace..... C. C. Wilson
Organ, Mechanically actuated..... C. I. D. Loeff et al
Oven, Front..... F. J. Albrecht
Package tie fastener..... W. A. Gross
Packing, Compressible piston..... J. C. Kitton
Pail and heater, Combined dinner..... S. C. Hays
Pail, Mixing..... C. E. North
Paper, Apparatus for making cloth lined..... E. Y. Le Fevre
Pen, Fountain..... O. E. Weidlich
Pen, Writing..... J. Andersson
Pen sharpener..... W. H. McFall
Photograph..... T. F. Solon
Photographs, Device for grouping..... G. G. Rodman
Photographs, Positive stripping film for..... J. E. Thornton et al
Photographic printing machine D'Argerbright
Piano desks, &c. Adj=stabe frictional support for..... F. H. White et al
Pick, Mining..... G. T. White
Picture frame and easel, Combined..... J. C. Strauss
Picture, Magic or surprise..... L. Lebatens
Pile driving device..... W. H. Ellis
Pile fabric and manufacture of same..... H. Hardwick
Pile fabric, Woven..... H. Hardwick
Pipe coupling..... C. E. Churchill
Pipe coupling, Concrete sleeve N. Rhoades, Jr
Pipe expansion joint, Soil..... C. L. Holt
Piston ring..... reissue..... W. C. Smith
Pitman connection..... P. E. Dix
Plant support..... C. H. Kanzman
Plant transporting box, Potted..... L. P. Lord
Planter, Corn..... J. B. Bartholomew
Planter, Potato..... W. J. Norris et al
Planter reel..... J. H. Groeters
Platform or staging support..... S. C. Johnson
Plow..... J. L. Weldon
Plow..... W. T. George
Plug and spring jack switch..... F. R. McBerty
Pneumatic carrier..... C. H. Burton
Pneumatic carrier..... O. S. Pike
Pneumatic despatch apparatus..... C. F. Stoddard
Pneumatic despatch tube carrier..... C. A. Murphy
Poke, Animal..... H. A. Simpson
Pole clamp or coupling..... C. B. Wynegar
Portable elevator..... C. N. Owen
Post..... C. E. Litzinger
Post cap..... A. S. Alschuler
Post office, Portable box..... J. H. Reighley et al
Postal or like transmission, Means for securing documents for..... G. J. V. Gold et al
Potato digger..... A. O. Connor
Potato digger screen..... H. W. Coon
Preserving jar..... J. S. Giles
Printing machine, Electric..... D. G. Smyth
Printing press delivery mechanism..... reissue..... G. F. Read
Projecting apparatus..... M. Martin
Propeller, Boat..... C. F. Ritchel
Propelling ships..... E. Bohn
Prospector's pan..... B. P. Herndon
Pulley block..... G. Agobian
Pulley for sashes, &c..... W. Livingstone
Pulverizing machine..... F. C. Nickel
Pulverizing machine..... A. Schoellhorn et al
Pump..... W. B. Tyler
Pump head..... W. & H. M. Williams
Rail chair..... G. A. Weber
Rail clamp..... T. W. Lingard
Rail clamp..... C. V. Rote
Rail joint..... C. J. Hoffman
Rail joint..... R. Callaghan
Rail safety clamp..... T. J. Harleman
Railway brake..... A. J. Dunmire et al
Railway or tramway rail fastenings, Means for securing..... J. E. Tonkin et al
Railway rails or other conductors, Electric bond for..... J. S. Alexander
Railway switch..... J. H. Clark
Railway switch, Electric..... R. L. Border
Railway switch mechanism, Automatic..... W. E. Harris
Railway switches or targets, Means for operating..... E. J. Gross
Railway third rail guard, Electric..... V. M. Newman
Ratchet wrench..... S. A. Swilley
Recording means, Key operated..... W. A. Crawford-Frost
Registering mechanism..... J. G. W. Romans
Roasting furnace..... L. T. Wright
Rolling helioids or spiral conveyers, Machine for..... C. O. Gustavsen
Rolling mill..... V. E. Edwards
Rotary engine..... W. G. Fritz
Rotary engine..... H. E. Marlett
Rouge, Impregnating cloth with..... J. E. Darby
Rubber dam holder and cutter..... F. R. Nice
Rubbing or polishing machine..... C. S. Yarnell
Rule case..... R. F. Hiler
Runway, Registering..... C. F. Strasburger
Sales memorandum holder..... W. Morton
Sand blast machine..... F. P. Boland
Sash balance..... C. Harris
Saw grinding machine..... J. Rose
Saw wheels, Device for turning band C. Souke
Scale, Computing..... A. C. Dodge
Scenic waterway, Wonderland..... A. A. Welsh

Screen operating mechanism, Diaphragm..... G. H. Marr
Sectional boiler..... P. J. Mulvey
Sewage purifying apparatus..... F. Martin
Sewer cap, Artificial stode..... J. E. Bedell
Sewing hooks and eyes on cards, Machine for..... F. S. Slaughter
Sewing machine, Wax thread..... G. L. Corcoran et al
Sewing machines, Cutter and cutting mechanism for buttonhole..... T. Hogan
Shackle rod connector..... E. A. Guy
Shade support, Concealed window..... J. D. Neal
Shaft coupling, Flexible..... C. F. C. Mehlh
Shaft, Flexible..... R. A. Shater
Shed, Sheep..... J. R. Morrison
Shell, Sectional..... G. H. Poor
Shellac substitute..... C. Ludwig
Shingle gage..... J. Dinwiddie
Shingle machine..... F. W. Burpee
Shoe..... W. W. Jenckes
Shoe, Laced..... G. T. McGuinness
Show case corner clamp..... L. Paulle
Shutter..... C. D. Spalding
Sifter, Ash..... J. Cromwell, Jr
Sifter, Flour..... W. T. Vallandingham
Sifting shovel, Ash..... S. H. Nyström
Signal system..... J. Shelton
Signal system, Electric..... O. Ernst
Signaling system and apparatus employed therein, Electric..... R. G. Callum
Signaling system, Wireless..... G. Marconi
Smoke stack..... P. Dickinson
Snow shovel..... R. C. Menzies
Soldering iron..... C. B. Rodgers
Speed indicator..... F. E. Wolf
Speed transmitter, Variable..... F. Miller
Spinning apparatus, Yarn..... W. F. Draper
Spooler..... A. E. Rhoades
Spooler guide..... M. E. Sullivan
Stair, Plastic..... F. R. Peterson
Stalk cutter..... A. J. Rush
Stalk pulling machine..... G. M. Kirkpatrick
Stamping press..... H. C. Lavery
Steam boiler..... A. Campbell
Steam engine, Reciprocating..... S. H. Schmidt
Steam generator..... O. Brunler
Steam shovel..... G. W. King et al
Stem winding and setting mechanism..... H. Sandoz
Stereoscope..... L. A. Dolph
Stigmatometer..... J. E. Chambers
Stone, Apparatus for the manufacture of artificial..... W. Schwarz
Stones, Producing refractory calcareous sand..... W. Schwarz
Store service apparatus..... E. C. Gipe
Stove burner, Gas..... E. Hage
Street or station indicator for tramways..... B. Rivkin
Stringed instrument operating mechanism..... W. W. Stallion
Structure guard..... I. L. Landis
Stud member..... H. Kerngood
Stuffing box, Lubricating..... F. C. Furlow
Superheater..... J. A. Stevens
Swimming attachment..... N. B. Lawson
Swimming bag valve..... H. A. Ayvad
Switch bar, Adjustable..... W. E. Hodge
Switch operating mechanism, Electric track..... C. W. & J. B. Squires
Switching apparatus, Electrical..... W. J. Richards
Tamping machine..... J. C. Moseley
Tank emptying apparatus, Liquid M. J. Adams
Tank forming device..... W. M. McNeil
Tapping and drilling machine..... F. Konout
Telegraph receiver, Printing..... G. A. Cardwell
Telephone exchange system..... C. E. Scriber
Telephone system, Automatic..... J. C. Slater
Tennis racket..... J. J. Savioie
Therapeutic purposes, Apparatus for..... F. H. Brown
Thermosensitive device..... W. M. Fulton
Thermostatic controller..... J. F. Siems
Threshing machine..... M. Davis
Threshing machine attachment..... J. B. Bartholomew
Ticket, Railway cash receipt..... J. A. Belet
Tiling, &c. Circular mold for making..... C. S. Larimer
Timber seat and support..... J. Tuteur
Toaster..... E. Shupe
Tongs for furnace charging cranes..... C. L. Taylor
Tool, Combination..... J. M. Clark et al
Toothpick holder..... C. P. Steinmetz
Toy, Mechanical..... T. J. Nardi
Tramway..... T. G. Gribble
Trolley..... J. S. Weckman et al
Trolley..... J. A. Lavery
Trolley controlling device, Automatic..... H. W. Nichols
Trolley pole..... A. W. Morgan
Trolley pole head..... J. E. Greenwood
Trowel..... H. G. Meyer
Truss, Hernia..... F. M. Croylus
Tubing fastening, Sectional..... O. P. Buckland
Tug attachment, Hame..... P. W. Schure
Turbine, Impulse..... A. G. M. Michell
Turbine apparatus..... E. H. Spear
Turnstiles, Cash receiving and change making apparatus for..... E. H. Spear
Turnstiles, Cash receiving, change giving and controlling apparatus for..... E. H. Spear
Twisting head..... G. A. Fredenburgh
Twisting machine, Thread..... J. M. Harrison
Type writing machine..... C. E. Yetman
Type writing machine ribbon mechanism..... C. E. Yetman
Umbrella rib retainer..... W. W. Climenston
Unloading apparatus..... G. H. Hulet
Uterine supporter..... M. J. Forrence
Valve..... G. G. Guy
Valve..... H. C. Rorie
Valve..... O. O. Storie
Valve..... F. W. A. Wiesebroek
Valve..... J. W. Nethery
Valve for internal combustion engines, Admission..... H. Power
Valve, Hot blast..... J. Kennedy
Valve or cock..... H. J. Moreland
Vapor conductors, Leading in device for..... M. von Recklinghausen
Vapor generator..... A. B. Wolyn
Vaporizing apparatus..... E. Fournier
Vault light construction..... W. L. Caldwell
Vaults, Device for sealing grave..... C. H. Hiser
Vehicle brake..... O. L. Dilworth
Vehicle, Motor..... E. A. Wright
Vehicle, Motor..... S. S. Scott

Vehicle motor suspension..... H. P. Maxim
Vehicle top..... G. B. Cooper
Vehicle, Two wheeled..... E. McPhee
Vending machine, Coin controlled..... S. L. Long
Vessel, Working..... S. Lake
Vessels, Apparatus for raising sunken..... D. C. Groves et al
Vise..... C. Arnold
Wagon..... F. Emberger
Wagon box..... C. H. Van Densen
Wardrobe or show case, 3 pats..... S. W. Bousall
Washer..... S. Newberry
Washing machine..... J. R. Carter
Washing machine..... A. N. Woodard
Washing machine and drier, Combined..... C. F. Schmidt et al
Washing machine stirrer head..... A. Wahle
Watchcase..... H. H. Patry et al
Water heater..... J. G. Hall
Water, Purifying..... V. M. George
Water wheel, Undershot..... J. W. Jacous
Waterproof suit..... N. B. Lawson
Wattmeter, Alternating current..... F. Conrad
Wett fork..... J. H. Foster
Weighing machine, Automatic..... H. Richardson
Weighing machine, Automatic..... F. M. & J. M. Gaume
Welding apparatus, Iron and steel..... A. C. Allen
Well tube support, Oil..... C. Card
Wells, Mechanism for raising liquids from deep..... T. F. Moran et al
Well cutting machine..... S. Y. Stockmore
Wheel sand band and scrape, combined, Vehicle..... I. W. Eddy
Wheel shoe attachment, Vehicle..... W. Cleeland
Winding machine..... S. W. Wardwell
Windmill coupling..... W. H. Nichols
Window..... 2 pats..... B. J. Hausfeld et al
Window construction..... B. J. Hausfeld et al
Wire bending machine..... J. A. Sanford
Wrench..... H. Cowan
Wrench..... S. Holzinger
Wrench..... G. B. Cooper
Yoke and swingletree, Convertible neck..... T. I. Hall

DESIGNS.

Buckle plate or similar article..... G. W. Dover
Luststand..... A. E. Manor
Match case..... L. F. Morloch
Mirrors, brushes, or like toilet articles, Handle for..... 2 pats..... S. A. Keller
Mirrors or similar articles, Back for hand..... A. W. Snow
Mug..... L. V. Arouson
Picture frame..... V. G. Graziui
Spoons, forks, or similar articles, Handle for..... G. H. Dyson
Spoons, forks, or similar articles, Handle for..... J. E. Straver, Jr
Stamp, Trading..... F. P. Hunter

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MECHANICAL PATENTS.

Achrodextrin, Making..... G. Reynaud
Acid from beet root molasses and making same, Organic..... H. Schrader
Adding machine signal..... F. A. Cottrill
Adhesive melting and distributing apparatus..... A. Jeffery
Air brake, Railway automatic..... F. B. Flanders et al
Air brake, Vehicle..... W. W. Walter
Air compressor..... H. M. McCall
Alarm system, Heat actuated..... C. E. Buell
Angle iron bending machine..... G. L. Vogel et al
Apparel attached pipe..... I. C. Clark
Autographic register..... E. J. Barker
Automobile..... F. E. Groat
Baby walker..... B. Leininger
Bale tie machine..... R. L. Jonansen
Baling press tying attachment..... R. S. Johnson
Balloon, Steering..... P. Delbert
Ballot box..... W. M. Teeter
Bank, Trick savings..... A. Rosedale
Barber's chair attachment..... A. D. Kandie
Bearing, Roller..... A. A. Lowry
Bed or couch and bath, Combined..... F. R. Buck
Bell..... P. C. Arnold
Belt guide and shifter..... W. P. Ruth et al
Belting..... E. Magaldi
Bevel and square, Combined..... F. G. Tague
Boiler..... A. A. Ball, Jr
Boiler..... W. R. Macklin
Boiler..... A. J. Peet
Bookcase..... L. W. Luellen
Bookcase, Knockdown sectional..... J. Richards
Book leaf margin cutting..... W. L. Jacobs
Book, Manifold sales..... J. S. Holmes
Book, Manifold..... N. A. McDonald
Book mark..... F. J. Tack
Book or pad, Manifold..... H. P. Brown
Boring machine..... D. Hepp
Bottle, Non-refillable..... S. M. Carraker
Bottle, Non-refillable..... I. I. Fonda
Bottle, Non-refillable..... T. J. Irwin
Bottle, Non-refillable..... E. H. Davis
Bottle, Non-refillable..... J. Doriot
Bottle, Non-refillable..... T. C. Rhodes
Bottle washing machine..... W. E. Brown
Box..... B. vom Eigen
Box..... R. C. Wright et al
Bracelet..... T. W. Johnson
Brake..... J. W. Tapp
Brick, Fire..... F. W. Shupert et al
Broom holder..... H. D. Harris
Brush attachment..... G. Mielenhausen
Brush, Tooth..... A. F. Blanchard
Bucket latch, Tramway..... B. C. Riblet
Building construction, Steel..... H. G. Hodgkins
Bung..... P. P. Menard
Bung hole borer..... F. Pfluger et al
Buoy recorder, Bell..... J. A. Fairbanks
Burner..... T. Stiles
Burner..... A. Plat
Button and tie holder, Combined collar..... J. B. Weaver
Button making machine..... E. Rosenwald
Calipers, Micrometer..... F. Spalding
Camera..... H. Goodwin
Can capping machine..... C. B. McDonald
Can lifter..... A. G. Beck
Cans, &c. Vacuum machine for..... C. B. McDonald
Cane, Magazine torpedo..... C. W. Leslie
Car..... 3 pats..... S. M. Curwen

Car, Combination stock, coal, and coke..... G. E. Simonton
Car, Convertible..... H. E. Haddock
Car coupling..... I. G. Nutt
Car coupling, Automatic..... A. J. Beard
Car draft and buffing rigging, Railway..... R. D. Gallagher, Jr
Car, Dumping..... W. Giesecke
Car fender..... L. M. Snyder
Car fender..... O. Thibault
Car fender..... R. G. J. Sandifer
Car frame, Metallic..... A. Stucki
Car haul..... F. V. Hetzel
Car, Metallic..... J. M. Hansen
Car, Mining..... A. Stucki
Car roofs, Means for attaching flexible roofing material to..... C. S. Bird et al
Car safety apparatus, Railway..... S. H. Short
Car switch, Automatic..... M. Nuss
Car trunnion and sash lock..... E. S. Bucknam
Car underframe..... A. Stucki
Carbonating apparatus, Liquid..... W. J. Young
Carbureter, Explosion engine..... R. E. Olds
Card clothing for napping machines..... D. Gessner
Carding machine..... C. Surprise
Cardboard or the like, Apparatus for cutting and beveling sheets of..... C. Johnson
Carpet fastening..... D. T. Foley
Carpet stretcher..... W. Andres
Carpets, &c. Fastener for..... J. P. Hull
Carriage, Folding baby..... A. B. Todd
Carriage top bow support..... E. W. Wright
Cart, Ash..... J. Altschul
Cash register box..... E. O. Bathen
Catheter..... I. F. Kepler
Cattle guard..... W. Houghton
Centerboard..... C. B. Wainwright
Cheese box..... C. T. & F. B. Smith
Chuck for holding sockets..... J. E. Baines
Churn..... A. C. Willis
Cigar cutter and match safe, Combined..... P. Seiler
Cigarette box..... A. A. Brown
Circuit controller, Manual and automatic..... W. L. Denio
Circuits, Potential indicator for high voltage..... J. E. Woodbridge
Clamp..... E. E. Aires
Clarifying and filtering apparatus..... D. L. Watson
Clock case..... W. J. Daly
Cloth steaming machine..... E. Gessner
Clutches, System for operation of magnetic..... A. C. Eastwood
Coaling station storage apparatus..... J. A. MacLennan
Coaster brake..... F. O. Bullis
Coin pocket attachment for envelopes, &c..... W. H. Coleman
Coin receptacle..... J. Anderson
Coke oven..... J. S. Maxwell
Coke quenching apparatus..... C. S. Price
Commercial security..... J. Dunne
Concrete and metal structure..... 2 pats..... R. A. Cummings
Concrete structure mold..... D. W. Boyes
Confessional service..... H. La Frise
Core..... W. C. Norcross
Core drill..... F. Stone
Corn husking machine..... G. L. Wackerow
Corn sheller..... J. H. Gilman
Corn sorter, Seed..... L. P. Graham
Corn stalk pulverizer..... J. C. Brooks
Cover Vessel..... 2 pats..... O. & F. Kampfe
Cradle, Suspension..... E. A. Bradbury
Crane, Traveling..... V. E. Edwards
Crushing and grinding mill, Vertical..... T. L. & T. J. Sturtevant
Crutch..... A. G. Kreimer
Curtain or drapery protector..... M. Goldsmith
Curtain pole..... J. Kroder
Curtain ring..... W. B. Swindell
Cuspidor..... F. A. Hinsky
Cut off wire cleaning device..... J. A. Saigne
Cycles or motor cycles, Self-contained stand for..... W. C. Lloyd et al
Decorticating machine..... I. von Oyen et al
Dental mouth mirror..... R. Walker
Dental plates, Making..... L. Eilertsen
Detachable bracket..... M. R. Muckle, Jr
Diagnosis apparatus..... B. J. Francis
Diaper fastener and hose supporter, Combined..... R. A. Ingalls
Dish washer..... D. T. Jones
Disinfecting apparatus..... R. J. Wilson
Door releaser..... W. A. Fagan
Door stay, Adjustable..... W. H. Reed
Dovetailing machine..... C. W. Deane
Draft and buffing gear, Friction T. L. McKee
Draft equalizer..... S. H. Garst
Drawing instrument..... W. S. Bowness et al
Drying kiln..... F. Meyer
Drill holder..... A. C. Kimball et al
Drilling machine attachment..... J. P. Barnes
Driving mechanism..... C. A. Eck
Dye, Red azo..... H. Witter
Dyes, Preparation of azo..... W. Loeb
Egg separator..... P. P. Menard
Elastic bands, Covering J. & F. N. Ashworth
Electric arc lighting..... J. A. Heany
Electric condenser, High tension, I. Mosicki
Electric currents, Light accumulator for continuous and alternating..... A. Engelsmann
Electric cut out..... P. H. Fielding
Electric heater..... E. F. Porter
Electric switch..... H. P. Ball
Electrical appliance..... P. H. Fielding
Electrical regulating mechanism A. B. Walton
Electropneumatic brake..... J. W. Cloud
Elevator cable drum..... P. M. Williams
Engine speed regulator, Explosive..... H. M. McCall
Engraving machine..... M. Barr
Engraving machine, Automatic..... M. Barr
Envelop or mailing device..... W. J. Carpenter
Excavator..... W. E. Jackson et al
Explosive engine..... D. L. Doering
Explosive engine..... J. E. Pfeffer et al
Eyeglass guard..... W. H. Wilson
Fabric treating apparatus..... M. Muntadas y Rovira
Fan motor..... A. R. Everest
Farm gate..... J. A. Clements
Faucet connection..... B. D. Knickerbocker
Feed, Apparatus for converting distillery slop into dry..... C. Anderson et al
Fence clamp..... W. C. Matteson
Fence post..... J. T. Martin et al
Fence post..... W. Ferguson
Fence post..... C. B. Detwiler

Fence post blocks. Apparatus for molding ... L. Wallace
 Fence. Wire ... G. E. Conklin
 Fertilizer distributor gearing ... J. S. Kemp
 File. Paper ... M. Rich
 Films in daylight. Apparatus for developing roller ... S. Jaffe
 Fire alarm system. Auxiliary ... W. L. Denio
 Fire and burglar alarm. Electric ... W. C. Barger
 Fire box ... A. H. Tucker
 Fire escape ... W. R. Hanretty
 Fire extinguisher. Automatic ... F. Grinnell
 Fire finishing machine ... W. E. Bock
 Fire resisting construction ... O. J. Owens
 Fire signal ... Z. T. Flowers
 Fire arm. Breech loading ... C. P. Fay
 Flea trap ... R. Bosshard
 Flush bolt ... C. J. Calver et al
 Flushing system and apparatus ... J. Landis
 Fly paper or trap ... B. A. Capehart
 Formaldehyde compound ... W. Sternberg
 Furnace ... W. N. Best
 Fuse ... W. McElroy
 Garden implement ... G. E. Harter
 Garment support ... E. O. Presby
 Gas and water separator ... A. J. Simmons
 Gas burner ... E. Ruid
 Gas engine ... F. A. Seitz
 Gas generator. Acetylene ... L. Montel
 Gas lighter. Portable electric ... E. R. Gill
 Gas lighting, &c. Automatic short circuit alarm for electrical ... F. M. Barrell
 Gas line cut off ... C. Bachmann
 Gas meter register mechanism ... J. C. Goodale, Jr
 Gas pipes. Automatic cut off valve for ... A. E. Sartain
 Gas producer hopper feeding device ... W. J. Knox
 Gate ... E. W. Easley
 Gear. Driving ... 2 pats. ... C. F. Jaehn
 Gearing. Friction ... J. W. Lambert
 Gearing. Transmission ... B. J. Carter
 Geodetic instrument ... K. Hein
 Glass grinding or polishing machine ... D. J. Murnane
 Glazier's point ... T. Widdop
 Glazier's tool ... T. Widdop
 Glue, &c. Melting and applying machine ... A. Jeffery
 Grain. Causing the germination of ... V. Lapp
 Grain cleaning attachment for elevators ... A. L. Dean
 Grain. Treating ... H. J. Caldwell et al
 Grinder. Roll ... W. R. Webster, Jr
 Grinding mill ... T. L. & T. J. Sturtevant
 Grinding mower knife sections. Device for ... F. Rohach
 Guy wire anchor ... B. Wilbur
 Hair drier ... L. Cuvelier
 Halogen tertiary butyl alcohol. Making ... 2 pats. ... T. B. Aldrich
 Hame fastener ... C. L. Corbett
 Harvester carrier and riddle attachment. Potato ... L. C. Dowden
 Harvester. Cotton ... N. Bowditch
 Harvester cutting apparatus ... W. R. Clarkson
 Hat crease retainer ... O. P. Oliver
 Hattling and fur refining machinery. Picker roll for ... L. R. Heim
 Hay derrick ... G. Garasson
 Hay rake. Dumping ... J. R. Danner
 Heating apparatus. Air ... G. A. Munson
 Heating apparatus. Electrical ... C. E. Carpenter
 Heating apparatus. Making electrical ... C. E. Carpenter
 Heating boiler ... E. O. Haskins
 Heel shaping machine ... J. J. Heys
 Hemp shaking machine ... J. P. Lowry
 Hinge. Friction ... V. C. Luppert
 Hinge. Spring ... E. Bommer
 Hoisting apparatus. Portable ... L. D. Frazee
 Hoisting engine drum ... T. S. Miller
 Horse boot ... M. Lane
 Horse detacher ... W. Schwartz
 Horse power ... D. Johnson
 Horse power attachment ... A. O. Gentry et al
 Horseshoe. Nailless ... D. W. Barr
 Horse bands. Machine for attaching, tightening and clamping wire ... W. A. Cummings
 Hose coupling ... J. W. Stewart
 Hose coupling. Steam ... E. H. Gold
 Hydrocarbon ... W. W. Porter
 Hydrocarbon burner ... H. H. Porter, Jr
 Incandescent mantle frame ... E. Lippitt
 Index Card ... C. W. Weston, Jr
 Index system ... P. W. Sommer
 Indoxyl, &c. Making ... A. Bischer
 Insulated rail joint ... J. C. Mock
 Insulated wire polishing machine ... O. T. Hungerford et al
 Insulator ... L. M. Randolph
 Insulator molding machine ... W. H. Schorling
 Internal combustion engine ... F. K. Landgraf
 Ironing table ... H. F. Ford
 Jar wrench. Fruit ... L. Rawdon
 Journal box ... L. R. & R. H. McLain
 Key retainer ... E. T. Burrows
 Knitting machine. Circular ... E. Langer
 Labeling machine ... F. H. Knapp et al
 Lacing hook ... G. W. Prentice
 Ladle tilting device ... W. J. Patterson et al
 Ladle tilting device ... W. J. Patterson
 Lamp. Electric arc ... J. A. Rignou
 Lamp. Electric arc ... J. A. Heany
 Lamp switch. Electric ... C. Wagner
 Lasting apparatus. Shoe upper ... W. H. Burritt
 Lathe ... P. Krepp
 Lathe attachment ... M. S. Kimble
 Lathe tool. Threading ... G. Goetz
 Leather graining machine ... C. H. Keefe
 Lens ... U. Nehring
 Lens grinding and polishing apparatus. Toric ... F. E. Collinson
 Lens grinding machine ... F. M. Clark
 Level and plumb. Spirit ... S. Winberg
 Leveling instrument ... B. A. Goodwin
 Lifting jack ... H. Schroer
 Linotype machine ... P. T. Dodge
 Liquid cooling apparatus ... W. W. Phares
 Liquid receptacle ... W. N. Sheaff
 Locket ... P. H. Long
 Log grab hook ... H. M. Rounds
 Loom. Automatic filing replenishing ... G. O. Draper
 Loom for weaving double faced silk ribbons ... F. G. Hettling
 Loom picker ... B. L. Bailey
 Loom shuttle box ... A. E. A. & G. Walker
 Loom temple ... E. Guilbert
 Loom warp crossing mechanism ... N. M. Shinn

Lubricator regulating valve ... C. A. Sullivan
 Magneto ... W. F. Taylor
 Mail marking machine ... F. C. Ielfield
 Mask. Protective ... H. B. Schutt
 Match box ... E. C. Carris
 Match safe and cigar cutter. Combined ... H. P. Klein
 Measure. Tailor's ... B. Simpson
 Measuring device. Lace ... C. Hodges
 Measuring device. Taper ... G. P. Hazelton
 Mechanical movement ... H. M. McCall
 Mechanical movement ... W. A. Pentecost
 Metal cutting shears ... C. Marxmiller
 Metal cutting shears. Rotary ... L. M. Ham
 Metals from ores. Extracting ... W. E. Greenawalt
 Mine drill ... J. B. Royer
 Miter cutting machine ... C. W. Dake
 Mixing machine ... E. L. Ransome
 Molding apparatus ... J. W. Campbell
 Molding apparatus ... G. D. & D. G. Rowell
 Molding machine ... F. W. Hall
 Motion. Device for the conversion of ... B. J. C. Howe
 Motor ... C. McArthur
 Motor mixing and vaporizing device ... E. B. Parkhurst
 Motor suspension ... W. G. Price
 Mower or reaper finger bar attachment ... C. J. Hirsch
 Mowing machine ... J. F. Steward
 Music leaf turner ... L. S. Miller
 Music roll perforating device 2 pats ... H. P. Ball
 Nitro compounds. Reduction of ... M. Buchner
 Nut and bolt lock ... W. R. Walker
 Nut. Axle ... H. A. Sherman
 Nut lock ... N. H. Roe
 Nut lock. Axle spindle ... E. S. Morris
 Offset cleaner ... J. Humphrey
 Oil under water pressure. System of supplying ... D. H. Mosteller
 Opera chair standard. Adjustable ... F. Hausle
 Ore breaker. Prospector ... A. C. Calkins
 Ore pulverizing mill ... W. Taylor
 Packing gasket ... J. J. & A. B. Schier
 Packing ring ... S. B. Mack
 Paper clip ... R. Gorton
 Paper clip ... A. F. Kelley
 Paper coating or enameling composition ... W. A. Hall
 Paper fastener inserting device ... G. C. Savage
 Paper sheets. Device for moving ... T. D. Robinson
 Paper sheets. Machine for feeding ... A. Gutberlet
 Parasol for children's carriages ... E. S. Tillinghast
 Paying apparatus ... 2 pats. ... A. Jeffery
 Pencil sharpener ... S. W. Bates et al
 Pencil holder and eraser. Combined ... A. S. Tucker
 Penholder. Multiple ... M. A. Pond
 Phonograph attachment ... E. Gilbert
 Piano automatic attachment ... J. A. Smith
 Piano pedal ... G. Merritt
 Pipe band and fastening ... A. W. Hight
 Pipe, cigar, or cigarette holder stem ... C. P. Cassidy
 Pipe cutting machine ... J. L. Hanna, Jr
 Pipe inverting device. Sewer ... A. Robison
 Pipe joint. Lock bar ... T. A. Gillespie
 Pipe wrench ... J. R. Berkheiser
 Pipe wrench ... J. W. Muskett
 Plane Router ... M. H. Parker
 Playing ball ... E. Kempshall
 Plow ... C. F. Bates
 Powder. Gun ... A. H. Robinette
 Printing machine ... F. H. Cottrill
 Printing press ... W. H. R. Toye
 Pulley. Ball bearing ... W. C. Habicht
 Pump. Diaphragm force ... C. H. Langill
 Pump. Fluid motive power ... H. T. Farnsworth
 Pump measuring device ... W. J. Bussinger
 Pump. Pneumatic ... R. W. Elliott
 Punching or riveting machine. Portable ... H. G. Morse
 Rail cleaner ... P. C. Hunter et al
 Rail fastening ... G. L. Hall
 Rail fastening ... C. E. Neubauer
 Rail joint ... R. Springer
 Rail support. Third ... L. Steinberger
 Rail systems. Collector for third ... A. K. Warren
 Rail tie ... C. A. Redinger
 Railway crossing. Electric ... A. A. Shobe et al
 Railway rail ... M. E. Harrison
 Railway road bed ... J. L. Silsbee
 Railway signal ... J. P. Coleman
 Railway tie ... I. C. Doyal
 Railway tie ... W. Payne
 Railway tie ... J. Booth
 Railway train detonating signal ... F. J. Erick
 Reamer ... E. C. Angell
 Refrigerating purposes. Apparatus for producing cold air for ... T. & W. L. Cole
 Register or counter ... A. J. Gillespie
 Rock drilling engine ... L. Durkee
 Rope drive apparatus ... G. H. Reynolds
 Rope socket ... C. Peters
 Rotary engine ... T. W. Nordenfelt
 Rotary engine ... H. B. Turner
 Rotary engine ... P. Lecomte
 Rubber. Calendering or friction coating fabrics with ... P. M. Matthew
 Ruffing and sewing machine attachment ... E. Burke
 Rule. Double plumb ... A. Vreeland
 Safe locking device ... C. M. B. & J. B. Boos et al
 Sash fastening, adjusting, and locking device. Window ... A. H. W. Wedler
 Sash lifter ... C. M. Rhodes
 Saw mill. Gang ... W. M. Wilkin
 Scaffold bracket hanger ... E. Fegert
 Scaffold. Hoisting ... S. D. Wheeler
 Scale automatic weighing and recording device ... M. M. Barr
 Scale record making apparatus. Weighing ... L. V. Labelle
 Screw driver ... O. Ohlson
 Sectional boiler ... D. S. Richardson
 Separator ... E. P. Waggoner
 Sewing machine ... E. J. Toof
 Sewing machine. Button ... F. H. Chilton
 Shaking separator ... P. H. Shue
 Shipping box ... J. Harper
 Ship's cowl ... C. A. Withers
 Shoe fastener ... G. Van Wagoner et al
 Shoe stitch divider ... J. B. Birrer
 Show case ... C. F. Murray
 Shutter fastener ... H. E. Goodman
 Shuttle. Weaver's ... G. Preiss
 Sieve. Adjustable ... C. W. Van Wye

Signaling apparatus. Safety device for electric interlocking or block ... F. T. Hollins
 Signature gatherer ... C. A. Iuengst
 Siphon ... reissue ... S. W. Miller
 Siphon. Double trap ... S. W. Miller
 Skirt ... W. Bush
 Slag car ... G. Mitchell
 Slime saving apparatus ... J. J. Smith
 Smoothing iron ... J. Kidd
 Solar heater ... E. Moss
 Soldering iron heater ... F. J. De Witt
 Sound reproducing machine governor ... J. F. Hardy
 Spanner wrench ... D. S. Miller, Jr
 Sparking mechanism. Variable ... G. E. Tregurtha
 Sparking plug teething apparatus ... J. E. Newton
 Speed changing mechanism ... W. L. Schellenbach
 Speed mechanism ... J. B. Bender
 Spinning ring ... L. Mellett
 Spooling machine stop motion ... G. P. Bosworth
 Spouted can ... F. Westerbeck
 Spring clip ... J. S. McKee
 Stacks. Wire harness for hay or other ... S. J. McDonald
 Stamp dispensing machine. Coin controlled ... H. Hill
 Stapling machine ... G. A. Ede
 Station indicator ... E. K. Adams
 Steam boiler ... A. C. Evans
 Steam engine. Compound ... J. B. Allfree
 Steam feed cylinder ... E. E. Thomas
 Steam regenerative accumulator ... A. C. E. Rateau
 Steam shovel ... G. W. King et al
 Steel wires or bands. Machine for making shavings from ... H. Graf
 Steering apparatus ... D. E. Hall
 Stereoscope cross bar ... J. T. Smith
 Still ... F. B. Merrill
 Stocking soles manufactured on circular knitting machines. Mechanism for forming double threads upon ... H. A. Houseman
 Storage battery ... T. A. Willard
 Stove ... F. G. Smith
 Stove ... S. S. Moore
 Stove. Hot water ... G. J. Hess
 Surface gage ... H. J. Hjorth
 Surgical apparatus ... J. Kleinbach
 Surgical bandages. Manufacture of ... J. E. Lee
 Syringe. Rectal ... E. A. Gilbert
 Tea steeper. Portable ... E. Totten et al
 Telegraph wires, &c. Post for supporting ... L. Griveaud
 Telegraphy. System of ... J. L. Creveling
 Telegraphy. Wireless ... C. K. Salisbury
 Telephone attachment ... G. A. Cowgill
 Telephone system. Selective party line ... A. J. Springborn
 Tent brace and rack. Combined ... E. B. Cabaugh
 Textile materials. Oiling and finishing ... R. S. J. & F. R. Carmichael
 Therapeutic purposes. Apparatus for producing an alternating magnetic field for ... E. Buhtz
 Thermostat and reversing valve ... F. W. Robertshaw
 Tire cover. Pneumatic ... T. Houben
 Tire fastening device ... J. T. Dickey et al
 Tire. Vehicle ... J. A. Swinehart
 Tires. Inflating pump for pneumatic ... N. F. Canepa
 Tobacco stem crushing machine ... E. Quiesier
 Tongue support. Vehicle ... C. H. Chapman
 Tool. Combination ... A. Wagniere et al
 Tool. Fluid pressure ... A. Palmros et al
 Tool. Impact ... W. Secher et al
 Toy. Mechanical ... B. F. Schwier
 Toy. Musical ... W. A. Gay
 Trace carrier ... C. G. Wallace
 Tramway terminal ... B. C. Riblet
 Tree tapping tool ... W. E. Fish
 Trolley ... 3 pats. ... J. H. Walker
 Trolley mechanism ... J. H. Walker
 Trolley pole ... C. F. Richel
 Trolley protector ... J. H. Best, Jr
 Trolley wheel guard ... C. W. Leslie
 Trowel ... G. Meyers
 Truck. Car ... 2 pats. ... J. A. Brill et al
 Truck. Elevating ... T. F. Gorman et al
 Truck. Maximum traction ... W. S. Adams
 Trunk ... P. Steiger
 Trunk dowel pin and fastener ... O. Rangnon
 Tube expanding, beading, and cutting tool ... H. G. Lykken
 Tube or flue cleaner ... T. J. Hart
 Tubes from refractory material. Production of ... E. Thomson
 Tug plate. Hame ... A. A. Thacker
 Turbine. Elastic fluid ... T. G. E. Lindmark
 Turbine. Steam ... F. J. Hedlund
 Type casting machine ... A. F. Zeitinger
 Type writer keys, &c. Electrical device for operating ... J. Pilsatneeks
 Type writing machine ... J. McKerchar et al
 Type writing machine ... 2 pats. ... J. G. Niederer
 Type writing machines. Auxiliary paper guide for ... T. L. Knapp
 Urinal ... H. M. Williams
 Valve. Dry pipe ... F. Grinnell
 Valve. Dry pipe ... J. C. Meloon
 Valve for steering engines. Controlling ... R. R. chardson
 Valve mechanism ... J. Kennedy
 Valve or faucet ... W. T. Welsh
 Valve. Reducing ... A. Roth
 Valve. Steam ... T. & J. R. Ray
 Valve. Steam engine reversing ... T. Sullivan
 Vapor bath ... C. E. Hurley
 Vehicle body ... R. L. Notman
 Vehicle brake ... J. G. Ecken
 Vehicle brake device. Motor ... F. E. Stanley
 Vehicle. Motor ... J. J. Phelps
 Vehicle rear guard attachment ... J. S. Towle
 Vehicle top awning ... H. D. Pursell
 Vehicle top spring support ... E. G. Martin
 Vending machine ... J. B. Hurd
 Vending machine ... F. J. Beier
 Ventilating, heating and cooling apparatus ... C. Cluthe
 Ventilating system ... W. S. Rogers
 Violin ... J. A. Heckenbach
 Voting machine interlock ... C. Christensen
 Wagon body clamp ... E. H. Dewes
 Wagon brake ... T. A. Strode
 Wagon. Dumping ... L. Field
 Wagon side board attachment. Grain ... W. E. Grannon

Washing machine ... J. C. McCulley
 Wash tub cover. Stationary ... P. W. Casler
 Water closet flushing apparatus ... A. La Bonte
 Wave receiver ... R. W. Shoemaker et al
 Weatherproof pole switch ... C. H. Jackson
 Weather strip ... W. J. Perry
 Weighing hopper ... E. W. Lindquist
 Weighing machine. Automatic ... G. Hoepner
 Weighing verifier. Coin controlled ... A. A. Caille
 Weight testing machine ... E. A. Smith
 Windmill swivel ... S. E. & S. W. Burke
 Wine, &c. Concentrating ... E. Monti
 Wire onto spools or shuttles. Apparatus for winding ... G. H. Berthelolt
 Woodworking machine ... N. J. Hutchinson
 Wool fat. Recovering ... C. E. Swett
 Woven fabric ... W. M. Stevenson
 Wrapper ... J. J. Hinde
 Wrench ... W. A. Stewart
 Wrench ... N. W. Kahle
 Wrench ... J. Sauer
 Wrench ... W. H. Wagoner et al

DESIGNS.

Car body. Motor ... 2 pats. ... J. Wilkinson
 Decorative fabric ... 2 pats. ... J. Cochrane
 Dial crest ... W. E. Ulmer
 Dish ... A. A. Robineau
 Dish ... J. Pass
 Hair pin ... A. W. Carlson
 Rug ... 2 pats. ... J. A. Carroll
 Spoons, forks, or similar articles. Handle for ... T. Heath et al

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MECHANICAL PATENTS.

Acids. Making fatty ... W. Connstein
 Adding machine type writing attachment ... E. B. Cram
 Air brake ... J. W. Bingley
 Air brake ... J. P. Kelly
 Air brake ... reissue ... W. H. Sauvage
 Air brake system ... J. Loftus
 Air compressor. Rotary ... G. A. F. Ahlberg
 Air moistening system ... A. Clarkson
 Aisle converting chair. Automatic ... H. J. Dohrer
 Alkyl esters of 3-4 diamido benzoic acid and making same ... E. Ritsert et al
 Ammunition ... C. Petersen
 Anchor ... C. Mitchell
 Animal subduing device ... A. W. Van Loghem
 Animal trap ... L. D. Mouser
 Anode and making same ... H. Blackman
 Antiseptic attachment for telephone mouthpieces ... J. Freil
 Auger bit ... N. Sperry
 Automobile climber ... S. E. Burke
 Automobile frame ... A. A. & L. H. Martell
 Automobile gear and brake mechanism ... W. H. Kemper
 Automobile pumps from freezing. Means for preventing ... H. Lemp
 Automobile steering wheel ... H. Goerss
 Axle box. Car ... E. Denegree
 Axles. Making ... C. Mercader
 Baling press ... W. Bullard
 Basin waste ... J. C. Reed
 Batteries. Exciting fluid for electrical ... 2 pats. ... G. F. Atwood
 Bean picker ... G. M. Dye
 Bicycle amusement apparatus ... T. W. Eck
 Billiard cue tip holder ... E. Hebert
 Binder ... H. E. Dade
 Binder attachment ... H. J. Schwarze
 Binder. Temporary ... G. W. Miller
 Blackboard composition ... L. Conner
 Boat ... J. P. Hickey
 Boat detaching device. Life ... A. N. Anderson
 Bobbin holder ... J. Roney et al
 Bobbins. Mechanism for removing waste yarn from ... A. Makepeace
 Boiler ... W. Jack
 Boiler cleansing apparatus ... J. Carter et al
 Bolster. Body ... J. Shelton
 Book cover and binder ... L. Morell
 Bookcase or like article of furniture having parts sliding in and out therein. Sectional ... H. C. Lord
 Bottle ... F. W. Lewis et al
 Bottle. Non refillable ... J. J. Bart
 Bottle. Non refillable ... J. Conrad
 Bottle. Non refillable ... J. W. Calef
 Bottle. Non refillable ... W. F. Mercer
 Bottle. Non refillable ... C. M. Rhodes
 Brick machine plunger ... T. S. Crapp et al
 Brick making machine. Pressed ... F. Helm
 Brick repress ... O. L. Gerwig
 Broom bridle ... N. N. S. Matcovitch
 Brush holder ... E. S. Lueth et al
 Bucket ... W. P. Davis
 Buckle. Harness ... C. G. Beyer
 Building block ... 2 pats. ... W. Porten
 Building block forming machine. Hollow ... J. H. Hendricksen
 Bumping screen ... E. L. King
 Button fastening ... J. E. B. Hicks
 Cabinet and means for storing, classifying and indexing photographs, cards, &c. J. C. Clarke
 Cabinet. Kitchen ... V. O. Rosser
 Cables. Automatic releasing device for noosed ... A. Tuttle
 Calcining apparatus ... D. L. Dibler
 Calendering rolls ... J. Stuart
 Camera. Folding photographic ... W. Gundermann
 Can covers in canning. Apparatus for holding ... E. W. Hayden
 Cans. Apparatus for exhausting the air from ... W. E. W. Cates
 Canvas fabric. Machine for inserting diagonal strands in woven ... E. G. Watkins
 Car brake ... W. C. Mitchell et al
 Car. Combined grain and stock ... A. Becker
 Car. Dump ... H. S. Hart et al
 Car loading machine. Mine ... G. F. Myers
 Car. Railway ... W. Wellman
 Car replacer ... P. C. Lockwood
 Car safety attachment ... B. Lev
 Car seat ... D. Rait, Jr
 Car sign. Street railway ... H. Witte
 Car starter ... H. T. Woolcott
 Car unloading means. Freight ... A. Weigand
 Carpet fabric ... C. C. Stewart
 Carpet sweeper ... W. D. Hodson
 Carriage electric switch. Motor ... H. C. Folger
 Cartridge. Explosive ... G. Cornara
 Cement brick making machine ... O. Staley et al

Cash and ticket register and bell ticket punch. Combined. P. Whiting
Cement post. L. H. Stoner
Cement to stock. Machine for applying. G. L. Rollins
Chain clamp. H. Huhn
Chain. Drive. 2 pats. W. H. Gates
Chart. Pattern. M. E. Northern
Cheese gage. W. H. Frank
Chimney. J. Lorenz
Cider press. W. H. Wenk, Jr
Cigar box. J. Morstatt
Cigar cutter and march ejector. M. P. McIntire
Cigarette machines. Machine for automatically preparing and feeding tobacco for. L. Lindelof
Circuit breaker. J. R. Anderson, Jr
Circuit breaker. W. J. Lloyd
Circuit breaker. F. L. Sessions
Clamping device. C. Seymour
Clasp. M. Rubin
Cleave. J. S. Weathers
Clock. Illuminated. H. Strasburg
Cloth tenting machine clip. H. W. Honeyman
Clothes line pin. J. W. Finch
Clutch mechanism. Reversing. 2 pats. W. J. Wright
Cock. Gas. J. C. Schlittenhardt et al
Cock. Stop and waste. C. A. Stone
Coke oven. C. Schroeter
Collar. Pneumatic horse. W. Ost
Colter fastener. C. Mueller
Comb. A. Fouts
Comb and brush. Combined. A. B. Durgin
Compasses. Electrical contact means for ships. B. Freese
Concrete block mold. G. S. Tiffany
Concrete building block molding apparatus. W. Porten
Concrete building block-molding apparatus. W. Porten
Concrete wall mold. P. H. Clingan
Conveyer. Cargo. C. H. Anderson
Conveyer chute. G. F. Conner
Conveying apparatus. Rotary. T. F. Flinn
Copskewer. A. W. Beardsell
Corn husking machine band cutter and feeder. A. Rosenthal
Corset clasp. G. C. Wenzell
Crate. Shipping. I. Stripe
Cream. Renovating. W. S. Gould
Cream separator. Centrifugal. P. L. Kimball
Cross tie hewer and veneer mill. B. H. Seymour
Cultivator. L. E. Waterman
Cultivator attachment. R. Titus
Cultivator. Garden and truck. T. F. Smithson
Current motor. C. O. Burchim
Curtain fixture. G. H. Davis
Curtains when being ironed. Device for holding. R. B. Barrett
Dental chair. F. Ritter
Derrick bull wheel. Revolving. A. Lambett
Desk. T. Kuntz
Dial sinking. C. B. Nichols
Dike. Submerged. D. Neale
Distribution system. W. M. Scott
Dividers. T. R. Skinner
Domestic press. L. H. Taylor
Door catch. Double. D. W. Tower
Door draft, rain, and dust excluder. A. Parker
Door securer. Portable. C. A. Glock et al
Dough treating mechanism. C. Laukhuff
Drail rigging. Double spring friction. F. B. Townsend
Draw bench with tongues returning device. J. J. Boax
Draw roll clearing device. P. Hardman
Drawing roll stop motion. A. Holmes
Drawing rolls for fibrous materials. Covering for. C. Shipp
Drill seed agitating device. P. W. Schwab
Drills. Rolls for twisting. S. Deak
Drilling machine. W. Holstine
Driving bit. R. W. Van Ornum
Drop extension. V. A. Menuez
Drum. Heating. C. J. Segerstrom
Duplex heater. E. Barnum
Dynamo. Continuous current. E. J. Javaux et al
Electric carrier. Overhead. C. M. Clark
Electric circuit regulating device. M. H. Baker
Electric circuit switch. G. Wright
Electric cut out. W. J. Hartwig
Electric furnace. C. P. E. Schneider
Electric machine. N. A. Christensen
Electric motor reversing means. C. M. Clark
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Engine indicator. Steam. F. Vaughan
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Envelop fastener. I. L. Rheutan
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Explosion motor. F. Charron et al
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Eyelid. Lacing. A. Fouts
Fancet or cock. H. Kupsch
Feed bag. W. Cook
Feed water heater. P. Grassmann
Feed water regulator. Boiler. H. B. Nichols et al
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Felting. T. B. Flavell et al
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Peat Substitute for Steam Coal.

Mine owners have predicted the entire exhaustion of the steam-coal beds in England within a generation. This possibility is deprived of some of its terror by the announcement that an electrical process has been discovered whereby peat can be converted into hard, smokeless steam coal which, while occupying less room in a ship's bunkers, will, it is claimed, hold its own against the best Welsh coal. According to a description of the process, the peat from the bog is placed in rotary cylinders, and after the water has been expelled by pressure, electrodes with electric wires attached are inserted and the mass becomes the medium of the completion of the circuit. Heat is generated by the resistance offered, and this in turn gives the objective result sought, namely, a perfectly disintegrated or pulverized material which separates freely into particles and has suffered loss of none of the properties primarily contained in the peat. Kneading and teasing operations serve to bring the mass into a plastic condition, so that it contracts into any shape or size desired. The cost is said to be much below that of coal at the pit's mouth. An initial plant is to be erected immediately in Ireland, where one-seventh of the surface of the land consists of peat bog.

Coal Wastes in a Power Plant.

The data obtained by the test of steam used up in leakage and condensation of a power plant sometimes furnish information of the greatest importance in determining losses, the extent of which can hardly be realized without their aid. The part which is represented by condensation in the steam pipes can readily be calculated and allowed for, and the quantity due solely to leakage losses determined. These are the losses produced by leakage of inefficient steam traps which drain the system of piping and reheater, and leakage of stop-valves which cut off the working part of the plant from the heating mains and from parts of the plant that are not in use, to say nothing of the numberless steam joints involved in the construction of the boilers and piping.

In a plant which is working only a part of the day, say ten or twelve hours, the fires being banked the remaining time, these losses, which may be termed the stand-by losses, are continually going on for the entire twenty-four hours, and they represent a larger percentage of the total fuel consumption than they do where the plant is in operation the whole time. Another loss in plants of this kind which is apt to go on while the fires are banked is by no means insignificant. This is the loss of fuel which results from too much draught being on during that time, either from improperly fitted dampers in the smoke pipe, or from carelessness in handling. The flow of air over the bank of fire produces combustion, the heat from which is expended in merely warming the air, which then passes off through the chimney to waste—*Cassier's Magazine*.

New Process of Manufacturing Ozone.

For the past few years the great importance of ozone for hygienic and industrial purposes has been more and more recognized. The general use of this potentiated form of oxygen was, however, restricted on account of the expensive method of its manufacture. The English engineer Elworth is now said to have found a process for manufacturing ozone, that is much simpler than those used heretofore and permits of a larger production.

Ozone is by him produced in an apparatus into which atmospheric air is forced by means of an air pump. An electric alternating current of 130 volts in 3 amperes, changed through a transformer to 1,100 volts, is then introduced. Through electric discharge in the apparatus ozone is engendered. The air introduced into the apparatus is forced through an ingenious system of pipes and escapes, highly ozonized, with great velocity, through a pipe which conducts it ad libitum to the places and the object intended to be treated with ozone.

The firm of Koelle & Held, of Stuttgart, has for some time past made interesting experiments with these apparatus, which are still continued. It has been proven so far that a much larger quantity of ozone is obtained than by previous methods. The apparatus works very quietly and without any interruption.

It is evident that such an increase of production means a cheapening of the price of ozone and, therefore, a more extended use. The apparatus takes up but little room, and can be used wherever the necessary alternating electric current of sufficient power is available, either through a small motor or from larger electric establishments.

Ozone, on account of its great oxidizing power, is well adapted for supplying oxygen to closed rooms, such as theaters, hospitals, manufacturing shops, etc., for purifying drinking water, for the purification of sewage, bleaching of leather, treating oils, etc.

If the new apparatus fulfills expectations it may result in new possibilities for public hygiene, as also for many industries.

A BEER PROOF alloy, recently patented in Scranton, Pa., is described in *The American Machinist*. It is composed of tin, antimony, copper, aluminum, and zinc, and is said to have the following properties: "The resulting alloy is a bright lustrous metal, comparatively light in weight and having considerable tensile strength, and is very desirable for the purpose of forming vessels intended to contain lager-beer, such as beer-vats, coolers, kegs, pipes, etc. At present such vessels are usually made of wood, iron or copper, and these vessels and the beer act injuriously upon one another. The wood decays and the iron or copper vessels oxidize, and in addition to affecting the beer, a great deal of scouring is required in order to keep the vessels clean. The beer and alloy do not act injuriously upon one another, and the alloy is kept clean with comparatively little labor. Its lightness and strength make it suitable for transporting beer."

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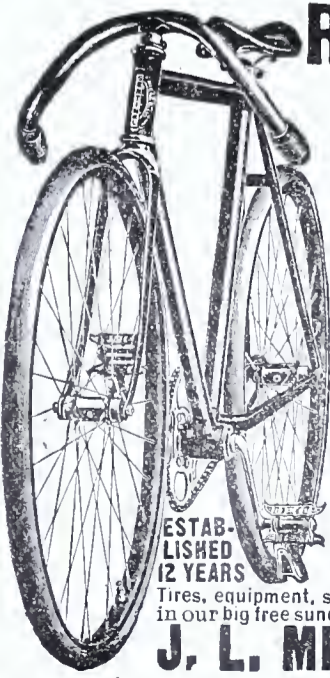
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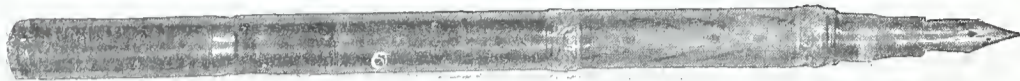
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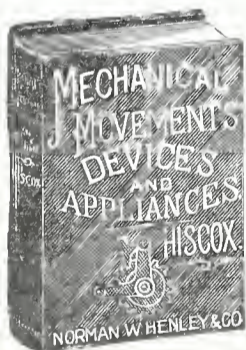
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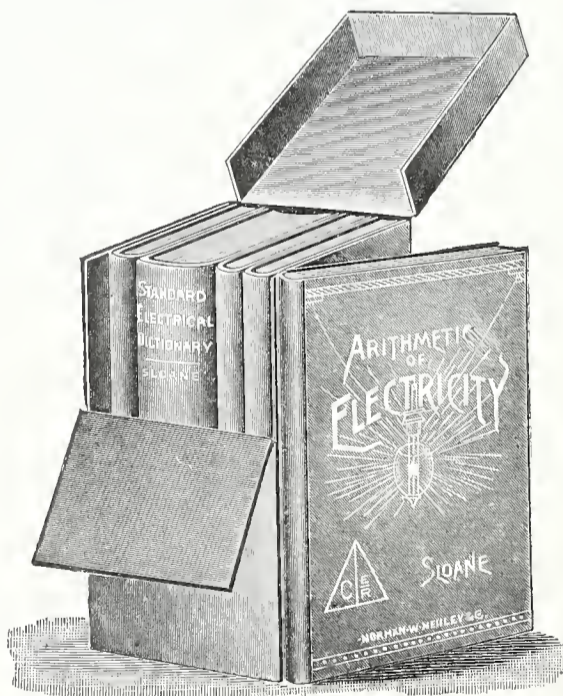
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A JOURNAL
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SIXTEENTH YEAR. }
No. 8. }

WASHINGTON, D. C.—AUGUST, 1904.

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AIR SHIPS.

THE forthcoming tests of flying machines, to be held at the St. Louis Exposition, have attracted world-wide attention to this novel form of locomotion. Only a decade ago, the idea that a man could fly was relegated to the limbo of absurdities, together with perpetual motion and the achievements of astrology. But, thanks to the studies of the flight of birds and experiments in dirigible balloons, motion through the air has been demonstrated to be feasible, even though its commercial availability is as yet an unproven quantity.

M. Santos-Dumont stands in the front rank as an aerial navigator, and all of his air ships, together with their journeys, have been described and illustrated in the press. A citizen of California has invented a balloon of the same class, which has been so successful in recent tests in San Francisco that the builder is confident of carrying off the \$100,000 prize in October. However this may result, it is certain that Dr. August Greth has achieved the most pronounced success in airship building yet recorded in the United States.

To the uninitiated, this balloon (see Figs. 1 and 2) closely resembles that of Santos-Dumont, but the inventor declares that there are many differences. Both are dirigible, both are lifted by gas, and both are spindle shaped; but the Brazilian airship is composed of two distinct bodies, the lower one suspended some twenty feet from the upper one, while the Greth invention consists practically all of one body. The Santos Dumont machine has one propeller, the other, four; in the first, the car swings like a pendulum; in the second, it is held rigidly close to the balloon, thus doing away with the oscillation and plunging motion; the first is steered with a rudder, the second with the propellers, etc. Dr. Greth explains that his airship is 82 feet long and 22 feet in diameter, holding 29,000 cubic feet of gas and capable of raising a ton. The steel framework that supports the car weighs about 100 pounds, and the motor is a common six horse power apparatus, of the sort used in automobiles. The ship can travel 30

miles an hour in a calm, and with an engine of increased power, much greater speed can be attained.

In the line of aeroplanes, (where many people think the future of com-

mercial aerial navigation lies) Professor Langley and Sir Hiram Maxim are the most noted inventors. The latter has built two captive flying machines, for the Earl's Court Exhibition

and for the Crystal Palace, near London, which will be used by the frequenters of these places of amusement. The inventor's object is to obtain enough money to defray the cost of serious experiments in aeronautics. He feels that the time has come when it will be practicable to construct a flying machine, which cannot fail to be of enormous value to his country as a military engine. The captive machine has a central vertical shaft, 60 feet high, to which are attached ten long radial arms, supported by steel wire ropes. From the ends of these arms are swung cars, each carrying half a dozen passengers. Each car is provided with an aeroplane, and by the varying of an angle and consequently of the lifting power, it can be made to move up and down and perform complicated evolutions in the air. The central shaft is driven by a gas engine, which can turn it at such a rate that the peripheral speed of the cars becomes about 65 miles an hour. The apparatus will afford pleasure seekers an entirely novel sensation, and will doubtless prove remunerative.

The tetrahedral kite, invented by Dr. Alexander Graham Bell, whose name is already perpetuated through the discovery of the telephone, is yet another contribution to the sum of knowledge on the subject of levitation. A tetrahedron, to use Dr. Bell's own language, is formed as follows: "Take three matches and place them end to end in the shape of a triangle, and then take three more, resting one end of each at a corner, so that the other ends will meet over the center of the triangle. This provides the skeleton of the tetrahedron. Tie the ends of the matches together, and you will find that the framework as a whole is wonderfully strong in comparison with its weight." The questions of strength and weight are all important ones in aerial navigation, and to increase the size of a machine does not increase its ability to sustain itself in the air. The model may work perfectly, but the great machine made on the model may not work at all. Dr. Bell believes that the tetrahedron is the unit of construction of the flying machine of the

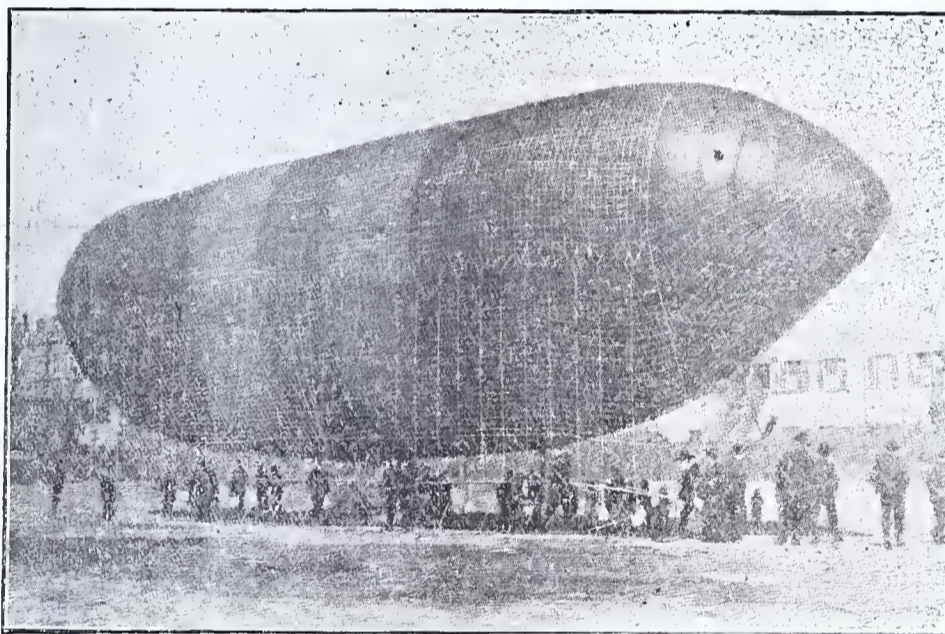


FIG. 1—A GENERAL VIEW OF DR AUGUST GRETH'S DIRIGIBLE BALLOON, WITH WHICH HE MADE HIS EXPERIMENTS IN CALIFORNIA THIS SUMMER.

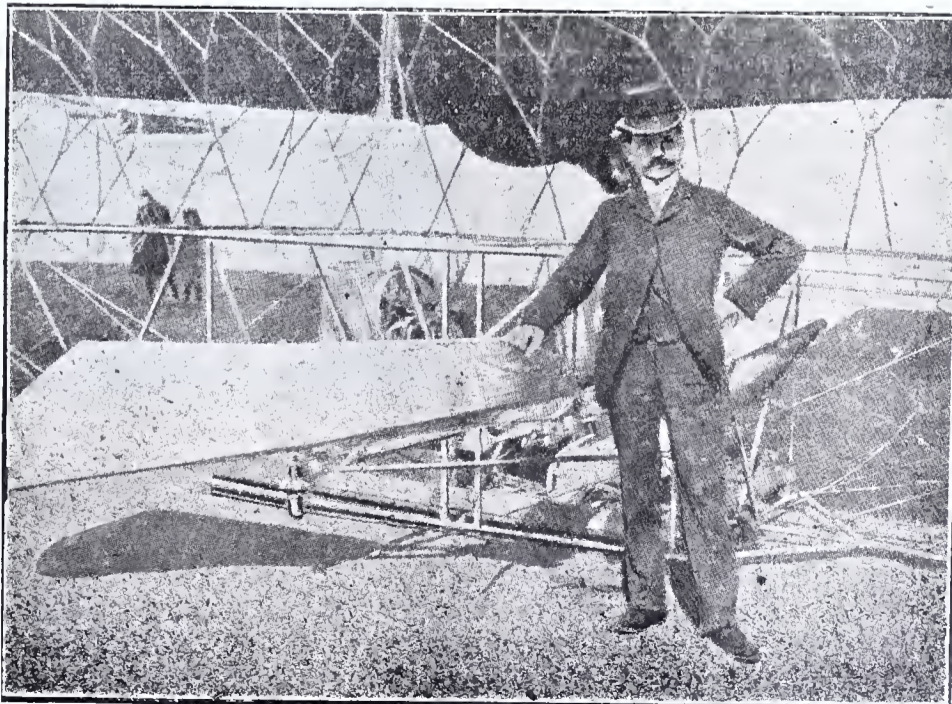


FIG. 2—THE MOTOR MECHANISM OF THE GRETH AIRSHIP—DR. AUGUST GRETH, THE INVENTOR, IS SHOWN WITH HIS HAND RESTING ON ONE OF THE PROPELLER BLADES.

future. These small units can be combined indefinitely on the same principle (see Fig. 3), and it is hoped that this enlargement and develop-

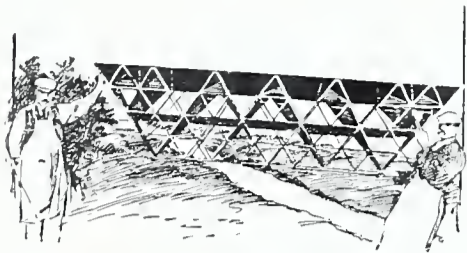


FIG. 3.

ment can be carried to a point where it will contribute practically toward the solution of the great problem of human flight.

Another flying machine, also constructed on the kite principle, is

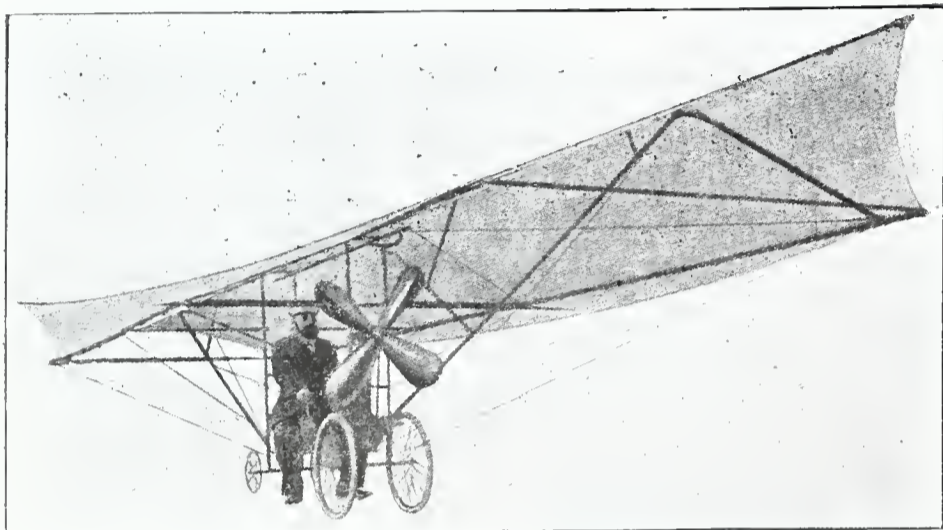
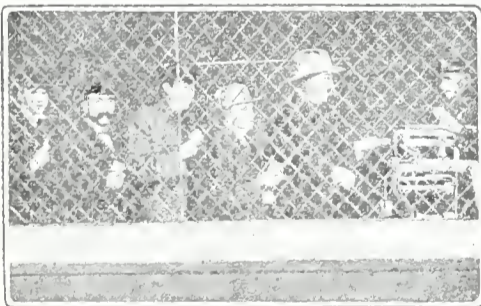


FIG. 4.—A HUNGARIAN MACHINE.

"Paying Their Weigh."

The illustration shows a number of railway passengers paying their fares according to weight. This interesting innovation in railway management has been adopted by the Rapid Transit Company in Colorado. Every ounce that travels by this line pays fare, whether it is an ounce of clothing or of human flesh and bone. The road is thirty miles long, and has ten stations. At each station there has been constructed a chute or passage,



through which all the passengers reach the ticket office. In this chute in a turnstile, which registers the number of passengers, and so checks the number of tickets issued. At the end of the chute is a scale on which the passenger stands for a moment while his weight is being taken. A ticket is issued for an amount regulated by the number of pounds each man weighs.

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credited to a Hungarian, Mr. E. Nemethy. The inventor uses a bearing surface resembling an arrow, (Fig. 4) made from linen, silk or aluminum, the wings of which are inclined downward so as to obtain the maximum cross section of air cushion, the axis of curvature being parallel to the line of flight. In order to obtain the necessary horizontal speed, parallel propellers are used, and the ship is directed by means of rudders. To start it, Mr. Nemethy provides a set of wheels, on which the whole machine may roll along, and these may be operated either by the propeller motor or a special motor. The device is certainly novel, but whether it will operate successfully remains to be demonstrated.

Wireless Transmission of Pictures.

The transmission of form by the agency of electricity was effected by the telautograph, invented by Elisha Gray, but certain inconveniences of working have prevented the wide use of this remarkable apparatus. It requires, for instance, the energy of two electric lamps at each end of the line. There now seems to be a prospect that pictures may be transmitted on ordinary telegraphic lines, and even on wireless circuits. A Munich professor recently tested an invention upon the telegraph lines connecting Munich and Berlin, and found that it worked satisfactorily. As the current intensities necessary to actuate the receiving apparatus are exceedingly small, it is intended to apply the system to wireless transmission.

The electro-magnetic arrangements consist of four coils, comprising two windings each, and crossing one another on a small board. Accordingly as the currents put into these coils are more or less strong and of the same or opposite directions, an enormous quantity and variety of currents may be generated in both directions, resulting in corresponding electro-magnetic effects. The practically unlimited number and variety of these current impulses constitute the most important feature of the apparatus, while the receiver shows a similar arrangement.

The Munich apparatus is likely to assume considerable importance as a fac-simile telegraph. In this case, the sending apparatus contains a pen, which is carried over the paper by means of a system of co-ordinates, and to which a similar device in the receiving apparatus corresponds.

It is believed that with practice, a speed of a hundred words a minute may be attained, and the apparatus may be used wherever a Morse is being employed. It may even be connected with a telephone and employed simultaneously with the latter. The range of transmission seems to be practically unlimited.

IMPROVED RAILWAY TIES AND FASTENINGS.

THE enormous consumption of timber for railway ties and for other purposes connected with railway construction, has caused serious concern to those interested in the source of supply. Vast quantities of wood are taken from our forests every year without any regard for the future. The market is steadily increasing with the extension of roads, the prices are rising, and the supplies are diminishing. Various expedients have been resorted to in this emergency, among them being the use of ties made of other materials than wood. Granite

altogether impracticable under the old methods are now entirely possible.

The nail spike that is used in this country for fastening a rail to a wooden tie is open to many objections, chief among which is that it does not hold with sufficient firmness to prevent creeping of the rail, which results in the wearing out of the tie. In using softer woods for ties, the fibers are broken by the spike, which causes decay; and respiking ruins the tie. A screw spike (see Fig. 1) would attach the rail to the tie more securely, thus preventing wear of the wood and increasing the stability of the track. The passage of the load over rails securely fastened to the tie would cause the whole body of the track to move in unison, and the up-and-down motion of the rails would be reduced to a minimum. Some such form of screw spike has been in use for years on European railways, and the accompanying illustration (Fig. 2) shows the method of inserting the spikes, by means of a key operated by two men. After the screw spikes are once put in, little work is required to keep them in proper condition. The wood is compressed by the threads as the screw enters, and the pressure of the core upon this highly compressed wood oppose a resistance to the loosening of the spike. Once a year the screws are tested and tightened, and they remain intact for such long periods of time that the extra labor, and consequent expense, involved in putting them in position is more than balanced by the fact that they do not need to be replaced at frequent intervals.

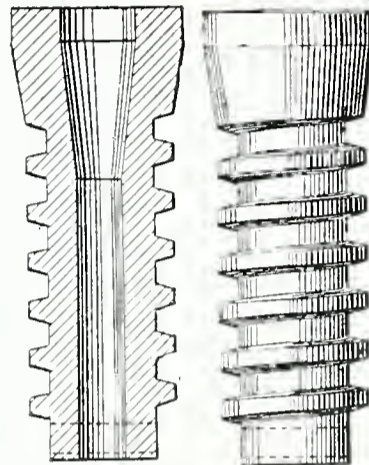


FIG. 1.

ties were among the earliest substitutes offered: they were used for some time in the south of Ireland, and also on an old road in Massachusetts. Steel ties have been tried in various countries, and concrete ties are now being tested. Most of the railroads, however, prefer to employ wood for this purpose as long as it is available, and some of them have even gone so far as to set out rows of trees along the right of way, so as to pro-



FIG. 2.

vide for future demands. The use of chemically treated woods would solve the problem, and this, though an innovation, is rapidly spreading. One of the advantages of the treatment of wood is that it allows the utilization of parts of the tree heretofore regarded as refuse. Sapwood, dead timber, and sawed ties, can now be employed, and tie forms that were

But this method of inserting the spikes, while possible in countries where time is not so valuable as in America, is too slow for our country, and a machine has been evolved for the purpose. This device, which is operated by electricity, is shown in Fig. 3, and is adjustable to all sizes of rails.

Some of the French railroads have

been using a novel form of tie plate, with remarkable success. This tie plate consists of creosoted wood about one-eighth of an inch in thickness, 8 inches long, and of the exact width of the base of the rail under which the plates are to be used. This plate corresponds practically to the shim frequently used in this country, except that it is much thinner. The ties are adzed at the treating plant so that a place is left for this flat wooden shim. It is held in place by the screw spikes, and when, in the course of time, it is worn out by the motion of the rail, a new one is substituted by giving the spikes one or two upward turns, shoving the shim in endwise, and fastening the screw again. The function of this device is to prevent the wear of the tie directly under the rail, and ties of soft wood have been used for years on the French roads, with the help of this plate, without showing appreciable decay. The wooden plates can be quickly and easily applied, and are very cheap. Arrangements have been made to test these plates on many roads in the United States. It is probable that the dimensions will be

consists of a small 5-horse power motor with a flexible shaft mounted on four wheels, the gauge of which can be varied at will. One man can easily manipulate one of these machines, and in France, an average of 2,400 ties per day are provided with six dowels each. With hand tools, one man can provide 15 ties with six dowels per tie in one day. As Americans work much more rapidly than Europeans, it is probable that this number would be increased here. The wounding of the tie made by screwing in the dowel is of so slight a character that not only is there little space for water to enter, but the dowel itself helps to make the wounded surface impervious to the action of water and protects it against fungi. The heads of the dowels also serve partially as tie plates. The experience of recent years with this device in France is noteworthy. On stretches of track over which an average speed of 60 miles an hour is made, a number of old ties were provided with dowels five years ago, and at the same time a number of new ties without dowels were laid. Last year, it was found that the new

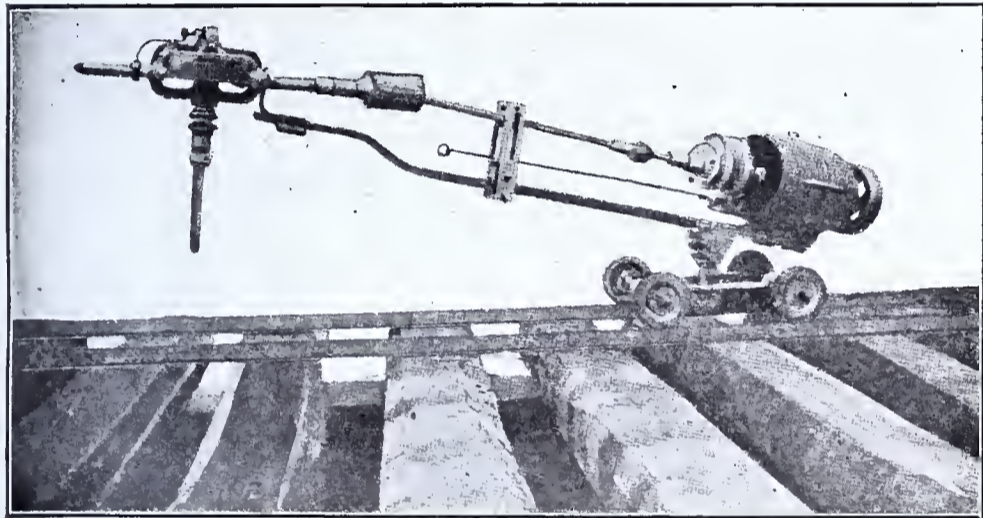


FIG. 3.

decidedly enlarged, to meet American conditions. The plates are made of beech, oak, poplar and red gum, and are heavily creosoted. Among other materials that have been used for this purpose are felt and horse hair.

As above noted, one of the greatest difficulties with soft timbers is that the wood about the spikes wears out with rapidity after the new tie has been put into service. This makes the track unsafe, as the rails are no longer held to the tie. A recent invention by a French engineer has shown notable results in the way of preventing this wear around the spike. His device (see Fig. 4) consists of a cylindrical piece of wood formed into a screw with a very wide thread. It is a little larger at the upper end than at the lower, so that when it is screwed into place, water cannot enter between the "dowel"—as the device is called—and the tie. A hole is bored in the center to admit either a screw spike or an ordinary spike. The dowels are made of carefully selected pieces of such woods as beech or birch, which have been seasoned and are heavily creosoted. These dowels can be put in place either by hand or by machinery. The machine shown in Fig. 3 can be used for this purpose as well as for inserting spikes. It

ties had worn out, while the old ones with the dowels showed practically no trace of wear. If this should prove true in this country, it might be possible to do away with the expensive steel plates now generally in use. The estimation in which Europeans hold

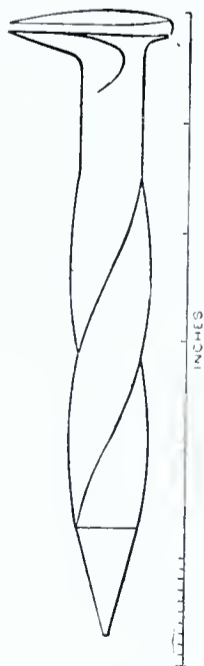


FIG. 4.

this device is shown by the fact that hundreds of thousands are being inserted every year in the railway ties

of Germany, France, Spain, and elsewhere.

In this connection, it is of interest to remark that a machine has been invented for measuring the deviation of rails from a straight and level line, that is a marvel of mechanical achievement. A man can now sit comfortably in a private car and see recorded on paper before him every imperfection of the rails over which he is riding. Some years ago, a track-walker with a hammer tramped the cross-ties to find out the same thing. The track-walker's work and much more is now done by this machine, which is called the dynograph. In appearance, it resembles a hand printing press. It is about 42 inches high, with a roll of paper 20 inches wide at one end. It has for its object not only to test rails, but to make records on the roll of paper attached to the machine, and it is operated by power gained from the rolling of the wheels of the car over the track. The paper is unrolled by a shaft attached to the axle of the car. The paper is thus moved slowly as the car travels. Suspended over the paper are glass tubes, containing red ink. They are really glass needles, that make a continuous mark on the paper. There is one needle for each track, one for the gauge of the rails, and another to measure the distance the car is traveling. These needles are all connected, first, by shafts attached to the axle, and then by delicate mechanism attached to each shaft. If the car is traveling over a perfectly level track, these glass needles make a straight line. If there is an undulation in the track of a fraction of an inch, the sensitive mechanism wavers and the line becomes broken. Since no track is perfectly level, the record for the best road-bed in America is wavering.

When the undulation or break in the level of the track is one eighth of an inch or more, the mechanism opens a hose attached to a can of blue paint on the trucks. The paint is splashed on the rail, and the defect is thus plainly marked for the section gangs. Every time the paint is thrown on the track, a mark is made by the glass needle, giving a record by which to check the work of the track repairers.

When the trip of the car carrying the dynograph is ended, there is recorded on the paper the sum total of the amount of undulation. This is done by a delicate apparatus attached to the dynograph. One inch on the paper means fifty feet of track. On a recent trip of the dynograph car, the four hundred and thirty-sixth miles on the run between New York and Buffalo showed the total undulations of one rail to be two feet and four inches, and of the other two feet six inches. This means that in one mile of track, the spaces between rails, imperfections in the rails, and deviations from straightness amounted to two feet four inches for one rail and two inches more for the other. This is interesting, inasmuch as no two parallel rails ever have the same record for a given distance. The heavier the rail, of course, the fewer the undulations, the smallest total ever recorded being on

100 pound steel rails, the heaviest now in service.

The dynograph car travels at the rate of thirty miles an hour, and at the end of the trip, the managers of the road can tell at a glance at the chart, just what is the actual condition of its road-bed. This sleepless guardian of railway safety is not only one of the most novel, but one of the most useful of inventions relating to transportation.

The "Poison Squad" Experiment.

About a year ago Professor Wiley of the Agricultural Department, selected twelve young men, after a thorough medical test, and fed them for a number of months on foods which had been treated with boric acid and borax, the object of the experiment being to determine the effect of such chemicals on digestion and health; it being well known that in canning fruits and vegetables, boric acid, borax and salicylic acid are used as preservatives. The general impression has always been that they are harmless, but the results of the test show quite the reverse. These young men were selected very carefully from a large number of applicants, the food was prepared by a Government chef, and every attention paid to the health of the young men while they were receiving free board from the Government. The trial seems to have demonstrated that while the human body can endure considerable quantities of boric acid in food without serious results, yet the steady absorption of the drug is unhealthy, and especially likely to work injury to persons of a delicate constitution. The Department finds that the continued use of boric acid even in small quantities, which produce no immediate palpable effects, and are not noticeable to the taste, results in loss of appetite, a feeling of fullness in the head, and distress in the stomach. Persons regularly using boric acid tend to lose weight, and analysis shows that a smaller proportion of prepared than of natural food is digested and made available for the body uses. The report of Prof. Wiley is thorough, conservative and makes no sensational charges that food is poisoned by borax. It admits that articles of only occasional use may be preserved with the aid of boric acid without harm; and he considers that meats shipped raw and not kept too long, may without bad results, receive an external coating of preservative which excludes germs of decomposition without destroying the parts below the surface. Nevertheless, it is emphatic in its warning against the habitual use of preserved foods, and in its demand that such foods be honestly labelled in order that the consumer may know what he is getting.

Glazed Butter.

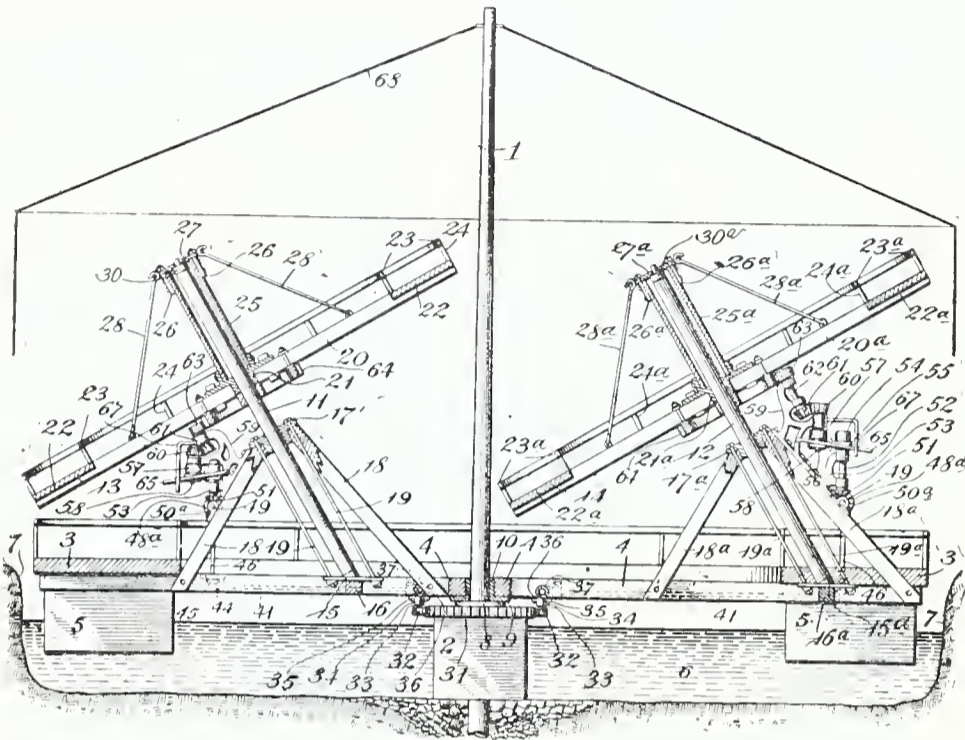
It has long been known in Germany that butter can be glazed by the use of sugar; that is, it can be coated with a glass-like sugar covering. This method seems to become of some importance, as butter so treated keeps fresh for a longer time than if not treated. It is first carefully kneaded and washed, then put into forms weighing 1 pound each, and placed in a cool room. The glazing is done by painting the surface with a hot sugar solution. The brush used should be very soft and the painting should be done quickly. The sugar solution melts the surface of the butter, and the sugar and melted butter form a sort of varnish which protects the butter against deterioration from outside influences.

CLEVER NEW PATENTS.

ROUNABOUT.—FLUE CUTTER.—PUMP.

Roundabout.

The American public is continually demanding something new in the line of amusement, and a person who can strike the public fancy is bound to make a fortune. At the present time inventors appear to be directing their efforts in a marked degree to novel means of locomotion or transportation, and all devices of this sort appear to be popular with the pleasure-seeking public. A new amusement device of this sort which can be cheaply built and operated is a roundabout, invented by Mr. Charles P. Beisel, of Wilkesbarre, Pa.—The in-

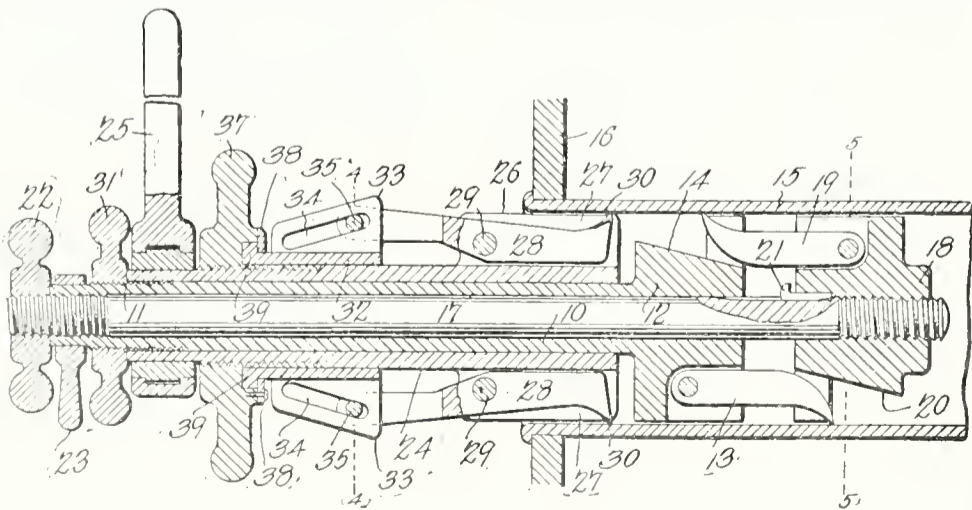


vention has for its object to provide, in a roundabout, means for imparting to the passenger-supporting portions of the apparatus a peculiar movement not hitherto produced by apparatus of the class specified and adapted to create novel sensations in the passengers.

The invention consists, generally speaking, in the combination, with a primary horizontally-disposed annular platform adapted for rotation in a horizontal plane about its own center as an axis, of a plurality of obliquely-disposed auxiliary platforms supported above the plane of the primary platform and each provided with mechanism for imparting thereunto rotary motion about an axis perpendicular to its own plane. The horizontal platform is rotatably mounted in any suitable manner, but preferably is supported by means of floats in a basin or pool of water. Upon the horizontal platform are journaled the obliquely disposed shafts, carrying inclined platforms. The main horizontal platform and the inclined platforms will be provided with seats or other devices for the occupants of the device, and any suitable means can be employed for driving not only the horizontal platform, but also rotating the inclined shafts and the inclined platforms carried thereby.

Flue Cutter.

A novel, and what appears to be practicable, implement for cutting boiler flues has been patented by Mr. John M. Sherman, of Columbia, Mo. As shown in the accompanying cut, a stock is provided comprising a shank, on which is slidably mounted a sleeve, the outer ends of the shank and sleeve having threaded connections, and their inner ends being provided with oppositely tapering heads. Holding dogs are pivoted respectively on one head and bear against the other. Thus, when the heads are inserted in the end of a tube to be cut, and the shank and sleeve moved in opposite directions by means



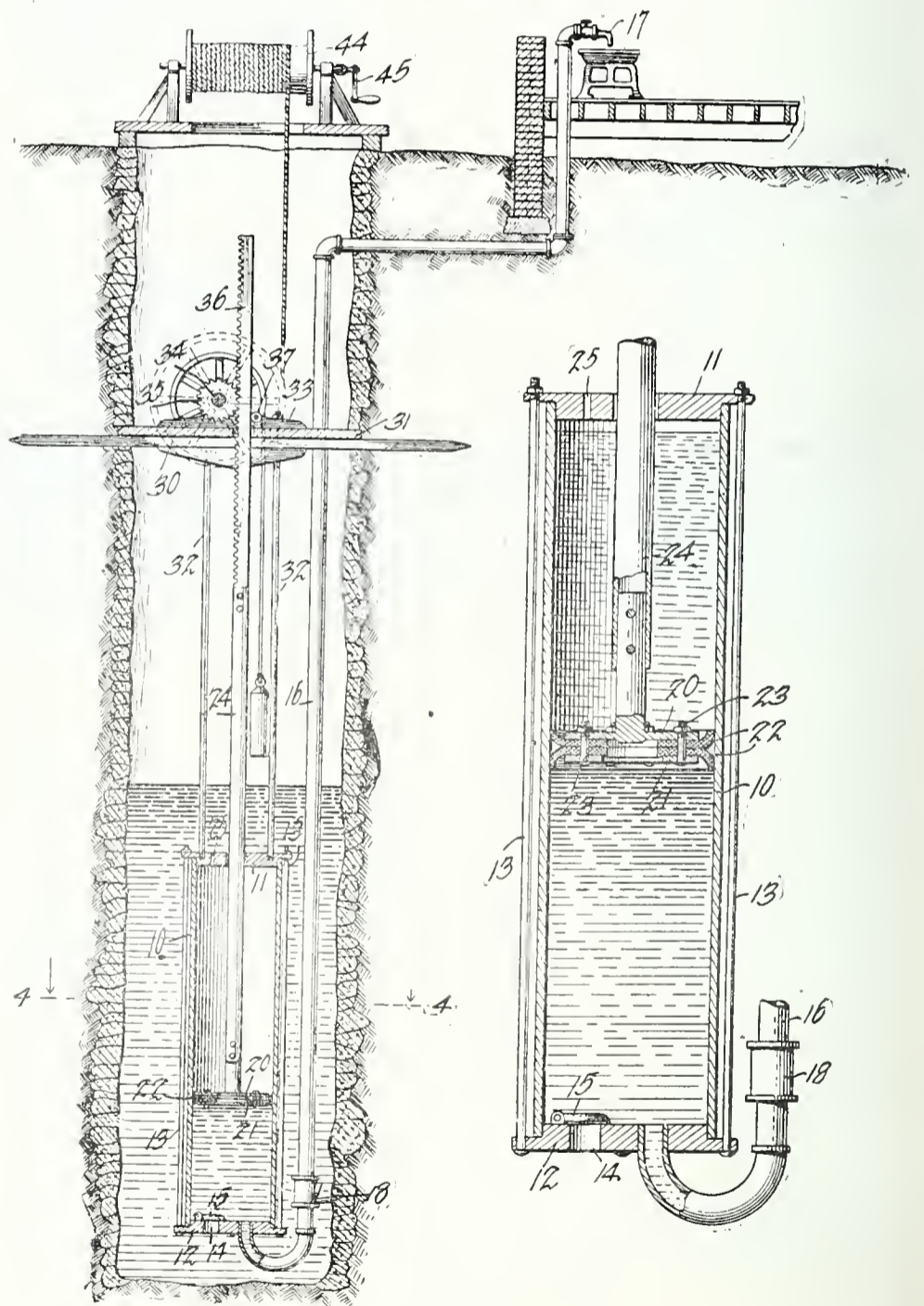
of their screw connections, the dogs are thrown outwardly, so that their sharpened terminals will embed themselves in the tube and thus hold the implement in place. Rotatably mounted on the sleeve is a tubular member, to the inner portions of which are pivoted levers having outwardly extending cutting teeth at their inner ends. The outer ends of the levers are provided with pins engag-

ing in the inclined slots formed in a head slidably mounted on the tubular member, and operated by a handle threaded thereon and having a revoluble engagement with the head. When this nut is screwed in one direction, the cutting teeth will be thrown outwardly into engagement with the tube to be cut, and the tubular member is then turned by a suitable handle lever, thus cutting the tube, the feed of the cutting teeth being secured by the adjusting nut. It will be seen that means are provided for forcibly expanding the levers, and means are likewise provided for forcibly rotating the sleeve, and when this is done, it will be obvious that the chisel-points 30 of the levers will cut a groove around the interior of the flue and quickly sever it by a uniform cut, which will not upset or otherwise abrade the metal or cause projections therein, so that after the cutting is completed and the outer severed end of the flue removed, the body of the flue may be removed through the aperture in the flue-sheet through which it was originally inserted.

Pump.

The question of water supply in country houses and in the smaller towns, where no municipal systems are installed, is one of growing importance, and it appears to be successfully answered by an invention of Mr. Ivy B. Robertson, of Manchester, Va., who has patented the same and assigned a one-fourth interest to Mr. Alvin Sayles, of Chesterfield County, Va.—The invention has for its principal object to provide an improved form of pumping device whereby a supply of water may be held under pressure in a pump-barrel within the well, and gradually discharged through a valved pipe leading to a house or other point where the water is to be utilized.

In carrying out the invention, a cylinder is employed which is submerged within a well or other body of water, being supported in any suitable manner. The lower end of the cylinder has a valved inlet, and from said lower end



leads a supply pipe that conducts water to the desired point. A piston is slidably mounted in the cylinder, and, attached thereto is a piston rod having a vertically disposed rack at its upper end. The teeth of the rack mesh with a pinion carried by a shaft, and the shaft is furthermore provided with spaced drums. A cable, wrapped upon one of these drums, has a weight attached thereto, while another cable, wrapped upon the other drum, extends to the top of the well where it is wound upon a windlass. In operating the device, the windlass is revolved so that the cable will be wrapped thereon, the shaft being thus turned to elevate the plunger and the weight. When the windlass is released, this weight will serve to force the plunger downwardly, and thus exert pressure upon the water which has been drawn into the cylinder. The water will consequently pass through the supply pipe to the point of use, where a suitable faucet is provided. It will be apparent by reference to the accompanying illustration that this system may be installed in an ordinary well, and thus a copious supply of water can be furnished at any point desired.

A NEW SPRAY FOR FRUIT TREES.

PETROLEUM is used for various purposes in California, aside from the customary employment for light and fuel. It is used instead of water for sprinkling the roads, and is said to be much superior to the first named liquid; and it is also, of late, being utilized as a spray for fruit trees. The prosperity of California depends to a large extent upon her famous orchards; but on account of the small margin of profit in the growth of certain fruits, fumigation is considered too expensive as a remedy for insects that attack them, and a mixture of oil and water is beginning to be used. The oils of California, being heavier

acting pump with 2 inch cylinders on each end, 10 inches long. The piston of the pump is driven backward and forward by the use of a bent shaft, with which a large cut gear is placed on the end, run by a pinion on the engine shaft.

The suction of the pump is taken from the bottom of the agitator tank and discharged into the air tank, which will withstand 300 pounds pressure. The power of the engine can run up the pressure of 300 pounds or more and can run four lines of spray hose with two nozzles on each line, which will consume 250 gallons of spray mixture in half an hour. The agitator

apparatus is mounted on a platform over a set of iron trucks, with 5 inch tires.

It is noteworthy that the lemon tree will stand a stronger mixture of the emulsion than the orange.

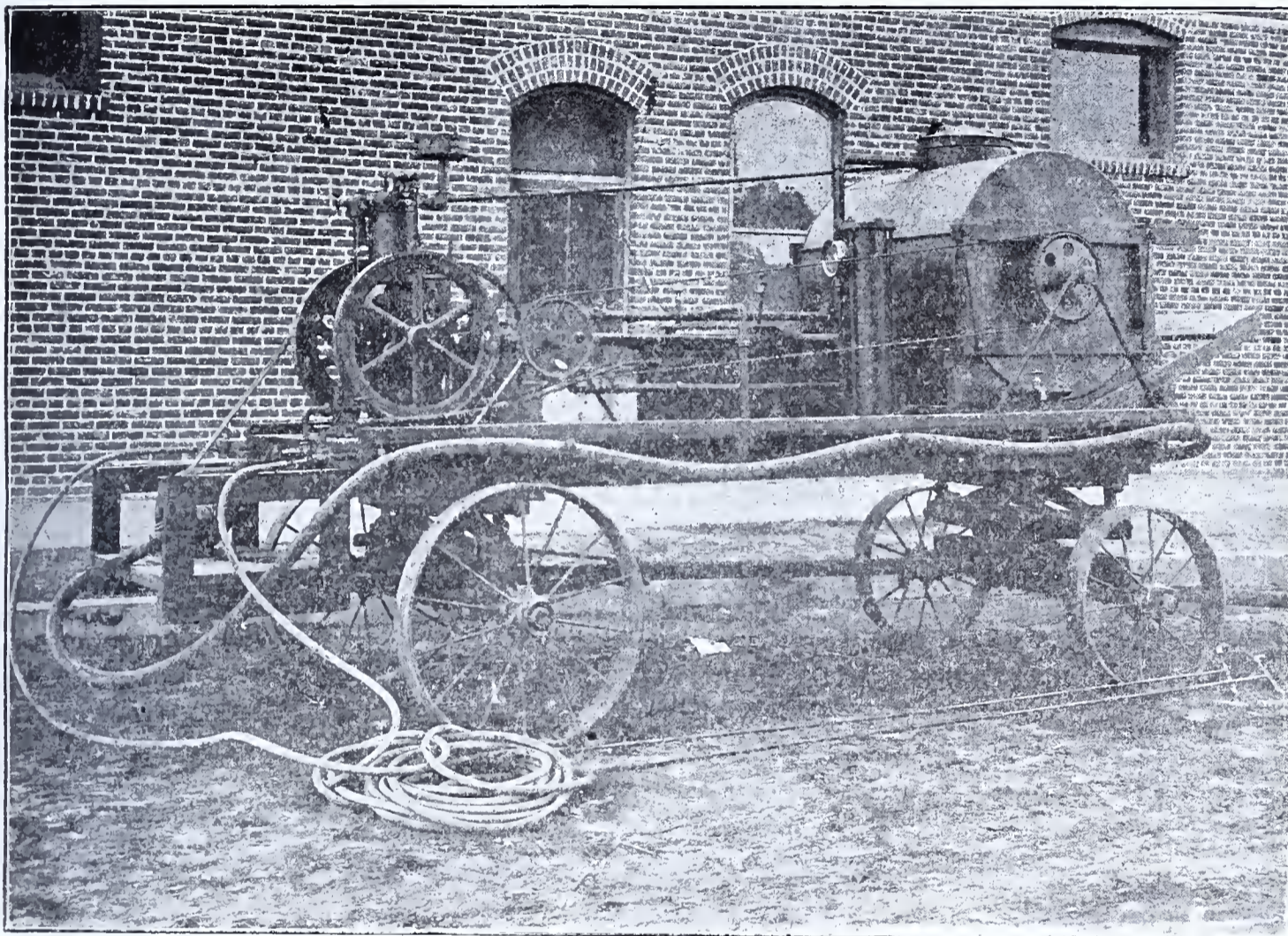
Warts and Moles.

The general impression is that these growths or skin excrescences are harmless, and, as a rule, no attention is paid to them unless they interfere with beauty; but the current idea as to their harmlessness will be largely dissipated in view of the report made by Dr. W. W. Keen, of Philadelphia, in a paper read before the American Academy of Science. Dr. Keen compared a wart to "a match that could produce a great conflagration," and recommended that all such growths should be removed at the harmless

stage. He pointed out that many of these moles and warts were congenital, or else having arisen later, had existed in apparent harmlessness for many years until in consequence of injury, friction of the clothing, scratching or other irritant, they began to increase in size and became malignant. He expressed the opinion that to wait until they began to grow would be waiting too long, and advocated that they should be removed, with the skin in which they grew, before any malignant change occurred, that is during the period of quiescence. Twenty-five cases were reported, arising on almost all portions of the body. Of the twenty-five, eleven patients were known to have died, sometimes in spite of multiple operations, or even amputation. There are certain chemicals which, when applied to a wart, cause it to disappear. Caustic is one of them, but by all odds the most satisfactory way to get rid of a wart is to cut it out, and this is the plan which is advocated by Dr. Keen.

The Value of Cigar Ashes.

A writer in the London Lancet points out that smokers throw away annually about 8,000 tons of valuable material, the same being the ashes of the tobacco that is consumed. He says that the ash left on burning tobacco is considerable, that the mineral part of the tobacco leaf frequently amounts to as much as one-fifth of its weight, and that a ton of tobacco leaf would yield four hundred-weights of ash, representing valuable mineral constituents withdrawn from the soil which must be replaced by other means. It has been calculated that a ton of tobacco withdraws over a hundredweight of mineral constituents per acre of land. In 1901, the home consumption of tobacco in the United Kingdom was at the rate of two pounds per head, or a total of about forty thousand tons, which represents, (what is probably a low computation,) approximately eight thousand tons of ash annually committed to the winds or dissipated in some way or other. On the face of it, there appears to be a fortune in store for the individual who devises a successful means for the collection of tobacco ash, and it is a great pity that so much valuable material should for ever be lost to the soil without any attempt at direct restoration being made.



than those of the East, lend themselves readily to emulsifying. Oil and water are placed together in the spray tank. The oil is added in a proportionate amount to give the strength required, and is kept thoroughly emulsified with the water by means of a rotating agitator in the tank operated by a gasoline engine. A very homogeneous and fairly stable milky fluid is secured, which does not separate for hours, and enables the mixture to be sprayed with perfect confidence as to uniformity of strength. Two or four lines of hose are commonly employed, and a pump provided with an air chamber to equalize the pressure.

The accompanying illustration shows a distillate power spraying apparatus which has been used with much success in orange and lemon orchards. It has the advantage of being designed to use not only the emulsion, but any other mixture. It is equipped with a 2 horsepower engine and a double

tank is horizontal, holding about 250 gallons, and has a shaft directly through the center in which three sets of paddles are bolted, each being four inches in width. The paddles are placed on the shaft at different places, and point in different directions. As these paddles revolve they throw the mixture in one direction. Three lines of breakers are placed lengthwise on the inside of the tank, which serve to throw the fluid back, making a double mixture. The paddles are operated by means of two sprocket wheels, one placed on the end of the bent shaft at the engine, and the other on the paddle shaft at the end of the tank, connected by a chain.

There is a small horizontal centrifugal pump, run by a belt from the engine, which is used, together with 25 feet of suction hose, to pump water out of a ditch or standpipe. By means of this, the agitator tank can be filled in four or five minutes. The whole

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MECHANICAL INVENTIONS AND DESIGNS

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Dr. Charles W. Carter, Alledo, Ills. Snap Hook.—The object attained in this invention is the provision of means for securely locking the hook in closed position, thereby preventing the danger of accidents which so often occur from the opening of these hooks. The usual spring tongue is employed having a shoulder that extends radially with respect to the pivot axis of the tongue. A locking lever or tongue is pivoted in the body of the snap and has a hook that engages the shoulder, the longitudinal axis of the dog being disposed at right angles to the plane of the shoulder. A single spring bears against the dog and tongue so as to hold them in co-operative relation. The general appearance of the hook is the same as the old style, but, with the improvements, there is absolutely no danger of the tongue becoming accidentally moved to open position.

Walter A. Stallsmith and Malden G. Beard, Hanover, Pa.—Clinometer.—The invention relates to improvements in instruments for determining angles and pitches for roofs and other structures, said instrument being arranged so that it may be employed as an ordinary spirit level, if desired. The usual block or body is employed having a recess between its ends, and to this block or body is hinged a carrier member in which is mounted a spirit level. A quadrant arm is detachably secured to the body at one end of the socket, and a carrier member slidably engages the same, a set screw being employed for securing the carrier member to the arm at any point desired. By swinging the carrier member, the body may be located at any pitch or angle desired, while the level will remain horizontal. When the instrument is to be employed as an ordinary level, the quadrant arm is removed.

Henry J. Coenen, inventor; R. Weyenberg and John W. Walsh, assignees, De Pere, Wis. Fly Screen.—This is probably one of the simplest window screens yet invented which will permit the escape of flies. The frame comprises the usual angularly disposed bars, with the exception that the side bars are cut away at their upper ends and the top bar is made thinner. The side bars are slit from the cut-away portions thereby forming tongues. The netting is made in two sections, one section being secured upon the upper portion of the screen and fitting under the tongues, the other covering the main body of the frame and having its upper end overlapping the lower end of the first mentioned section. This provides an aperture the full width of the screen, that permits flies to readily pass upwardly through the same, and thus escape.

John G. Root and John C. Westervelt, Shelbyville, Ills. Apparatus for Cleaning Hay Barns.—In baling different kinds of material, especially hay, there is always a great deal of refuse, formed of chaff, seed and small particles, which accumulates about the press and over the floor. This refuse is continually in the way of the operators and must be constantly cleared out. Furthermore, it contains much valuable matter, in the shape of seed, which has heretofore been wasted. The inventors have provided means which will automatically dispose of this refuse by removing it from the region about the press, thereby preventing its accumulation and

interference with the pressmen; and, moreover, they have obtained a very broad patent on the means for accomplishing this. The press is placed on the slatted floor and beneath the same operates the conveyor. The conveyor transports the waste material that passes through the slats to a seed separator, and from thence the refuse, in the form of chaff, is carried back to the press, so that each bale has its share of the same, and the seed is saved and becomes a valuable product.

William P. Yancey, Tampa, Fla. Wheel.—The object of the invention is to provide an improved structure which will run smoothly over a paved street or unpaved roadway, and when upon a soft or sandy road, will not sink deeply into the same, but will have an engagement therewith to prevent slipping. The tire is particularly useful in connection with automobiles, but is clearly adapted for bicycles and all kinds of vehicles. The tire may be made in various ways, but preferably consists of a metallic band having sockets cut therein, one wall of each socket being radially disposed with respect to the axis of rotation of the wheel, and the opposite wall being inclined. Cushioning material may be located between the felly and tire, and a backing strip may also be employed.

Newton K. Bowman, North Lawrence, Ohio. Hoop.—The present invention relates to hoop splices for barrels, casks, tubs, and the like, and the device is one of the simplest as well as most efficient structures yet produced. The hoop may be constructed of any material desired and has its ends abutted. Bridging the joint between them is the splice in the form of a sheet metal plate, that surrounds the abutted ends and is provided with spurs embedded therein. A strong and inexpensive connection is thus provided, which entirely obviates the necessity of overlapping the ends of the hoop, as is commonly done.

Byron B. Holmes, Lincoln, Nebr. Calculator.—Merchants will be interested in this device which relates particularly to means for computing lengths of cloth and the like. It consists of a platform having a longitudinally disposed slot, and a transversely disposed slot, a scale being located alongside the latter. Beneath this platform and moving transversely thereof is a table of calculations, the calculations being successively exposed through the longitudinal slot, an operating device for the table projecting through the transverse slot. Disposed between the table and the platform is an indicator in the form of a longitudinally slidable plate having a sight opening aligned with the longitudinal slot, so that but one of the series of calculations aligned with the longitudinal slot of the platform is exposed at one time.

John N. McGriff, Anderson, Indiana. Weather Strip.—The inventor has attained by a most simple construction the very desirable objects of preventing the ingress of cold air and the egress of warm air through the cracks usually found about doors, said device, furthermore, preventing the disagreeable rattling of the doors and being readily applicable to any frame by a person of ordinary intelligence. The strip consists of rubber that is substantially triangular in cross section and is adapted to be placed directly against the jamb of the door frame. One of the projecting sides is longer than the other so that, when the door is shut upon the strip, the bulging thereof is permitted without obstruction. Preferably an air cushion is formed in the inner side, which permits the more ready yielding of the strip under the impact of the door when closed.

Harrison E. Knauss, Easton, Pa. Chair.—Notwithstanding the fact that it seems almost impossible, in view of the highly developed state of the art, to improve reclining chairs, Mr. Knauss has made an important advance in the same, and is well protected by his patent. A base frame is employed, upon which is mounted a rocker seat, and to the rear end of the same is pivoted a back, capable of being swung to a horizontal position and having legs which, when in such position, will support the rear end of the same. In this relation the structure constitutes a couch or sofa, the seat thereof being disposed at an inclination and forming the head rest. Means are provided for locking the seat against its rocking movement and for supporting the back in various inclinations. A combined article of furniture is thus secured, which can be employed as an ordinary easy chair, as a rocker, a reclining chair, or a couch.

Jesse B. Cretors, St. Paris, Ohio. Vehicle Apron or Hood.—The object of the invention is to provide means which will permit an apron or hood to be readily applied to vehicle tops of different sizes and makes, and will fit snugly upon the same to the exclusion of rain, mud and dust. The hood is made of the usual rubber or moisture-proof sheathing, and to the upper edge thereof is secured in a novel manner an adjustable strap, formed at its ends into detachable loops arranged to engage the posts or studs of the top. Another strap secured to the lower portion of the hood surrounds the dash, while means are employed for attaching the rear edges to the lower portion of the top frame.

William Block, New York, N. Y. Metal Bending Machine.—A very useful machine, and one that is entirely novel, is covered by this patent. The machine is devised particularly for bending the blanks of linings for flushing reservoirs, and the like, though useful for many other purposes. Broadly stated, it consists of a reciprocatory turn table, the opposite edges of which co-act with spaced adjustably mounted bending rolls, that are positively driven. The means for driving the rolls also effects the reciprocation of the turn table, and suitable mechanism is employed for throwing the turntable into and out of operation. In use, the blank to be bent is placed upon the turn table, which is then passed beneath the rollers, so that two opposite sides of the blank are bent to form. After having passed beneath the rollers, the table is turned to bring the opposite wall blanks in co-acting relation with the rollers, and thereupon the table is passed backwardly, finishing the blank.

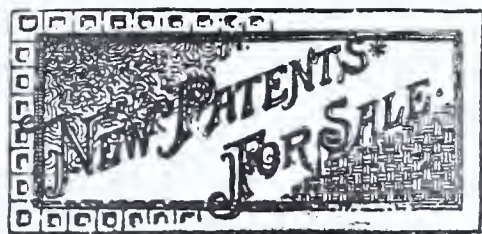
Edwin E. Frederick, inventor; Frank B. Elder, assignee, Bellevue, Pa. Gas Regulating Means.—Prior to this invention, no satisfactory means had been devised for regulating the flow of gas to incandescent burners of that type commonly known as "Welsbach"; and, in order to operate this class of burners most successfully, the flow of gas must be controlled at the extreme point of exit, so that the force of discharge will not be seriously interfered with. Mr. Frederick has accomplished this in a very simple manner. Located in the gas nozzle is a sliding plunger, having a needle valve which is movable into and out of the orifice of the nozzle. Extending through the wall of the conduit is a lever having a ball-and-socket joint with the conduit, and having a ball-and-socket joint at its inner end with the plunger, a clamping device for holding the lever in place also serving in the nature of a friction brake to hold the lever and consequently the plunger in any posi-

tion desired. The outer end of the lever constitutes a handle by means of which the device can be operated. Thus, by swinging the device in one direction, the valve is moved to open position to open the nozzle, and by swinging it in an opposite direction, the discharge orifice can be closed to any degree desired.

Felix Horwart, Long Island, Kans. Stock Waterer.—This is a waterer that will appeal both to the manufacturer and to the stock raiser, to the first, because it can be made and consequently sold cheaply, and to the second because it is an efficient device and may be readily applied to a barrel or other reservoir. The trough is screwed upon a tube having a square head and threaded at its ends, one of the ends receiving the trough, the other being adapted to be secured in the reservoir. Extending longitudinally through the tube is a valve stem carrying a valve at its inner end that closes the inner end of the tube, the valve being held in closed position by a spring coiled upon the stem. A plate, pivoted in the trough, has a depending lug that bears against the stem, so that the stock in attempting to reach the water beneath it, will press the plate downwardly, thereby opening the valve, and permitting the flow of water to the trough. A screen boxing, threaded on the inner end of the tube, covers the valve and also prevents the passage of refuse to the trough.

James W. Scott, Camden, Me. Stop Motion and Alarm for Carding Machines.—The apparatus described in this patent is intended for use in connection with a carding set and is designed to stop the machines automatically when the sliver breaks, or when there is such irregularity of the feed as necessitates attention to the feeding mechanism. Provision is also made for the automatic sounding of an alarm when the stop mechanism is operated, in order that the attendant may be apprised of the trouble. A belt shipper, arranged to ship the driving belt of the set or of an individual machine, is operated by a tripping mechanism includes electrical circuits in which are located circuit closers. One of these closers is arranged to be operated upon the breaking of the sliver in a manner well understood in the art, and the other is dependant for its operation upon what is termed a floating leaf in the form of a flat, smooth plate, supported by the sliver passing over the Apperly feed table. This leaf is sustained by the sliver and is of such dimensions that, while it will not be affected by slight irregularities in the sliver passing thereunder, it will, nevertheless, drop and thus close the circuit when the irregularity or thinning of the sliver passing over the table is general. The circuit closing devices are also common to an alarm circuit, which is automatically closed to sound an alarm whenever the machines are automatically stopped.

James W. Scott, Camden, Me., and George W. Taylor, Oakland, Me. Attachment for Carding Machines.—This appliance, like that of the Scott patent before noticed, is designed for the improvement of carding sets. The object is to collect the short stock that falls from the breakers of the carding machines and to return the same to the feeder after cleaning. In the illustrated embodiment of the invention, an endless conveyor extends under the several machines to catch the short stock dropping therefrom, and operating to convey the collected stock to a series of dusting rolls in the form of rotary brushes, which effectually separate the stock from the dust and to deliver the former to the hopper of the Bramwell feeder, from whence it is re-fed to the first breaker.



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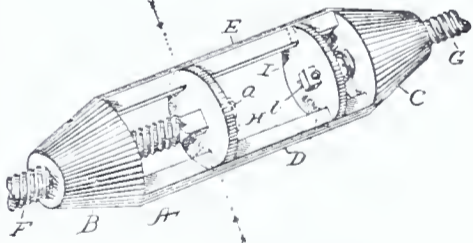
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ONE PHASE OF THE PROSECUTION OF APPLICATIONS.

In the prosecution of applications for patents, it should be the aim of the attorney to secure for the inventor as broad claims as possible, and in pursuance of this object, he should have the hearty co-operation of the Patent Office; but it is unfortunately true, that in some instances, he meets with the settled, determined opposition on the part of the examiner of the Patent Office to grant broad claims on the invention. An application including only a few weak claims may go through the Patent Office at railroad speed, but an application containing broad claims intended to protect the inventor's interests, is likely to meet with strenuous objection at the start. One would suppose, from the objections which some examiners make to the allowance of broad claims, that it was depriving them of something when they granted inventors broad claims in their patents; at least, one gets this impression by reading some of the criticisms expressed in official actions on applications for patents. Because of this fact, a premium is put on the careless and indifferent prosecution of an application for patent, for the attorney who secures the allowance of a patent in a short time, due to the fact that he has presented only a few weak claims in the application, is commended by his client for his diligence: while the competent, conscientious attorney who laboriously prosecutes the application for the obtainment of broad claims, is condemned by his client for his dilatoriness. And worst of all, the actions of some of the examiners of the Patent Office make the work of the conscientious attorney more time-killing and laborious through the citation of patents and the raising of objections, which unnecessarily delay the grant of a patent and accomplish no good purpose.

INCOMPETENT PATENT SOLICITORS.

In the July AGE, we commented upon the lack of wisdom displayed by some inventors who seek to obtain their patents by acting as their own attorneys, though it is equally unwise for an inventor to apply for a patent through an attorney who has had little, or no experience in patent matters.

It quite frequently happens that an inventor in a remote section of the country consults with an attorney-at-law, whose practice is confined to civil and criminal matters, and who knows as little about patent law as the average inventor. Instead of explaining his lack of knowledge, and advising his client to consult with a skilled patent lawyer, the attorney-at-law is pretty apt to do either one of two things: First, prosecute the application himself and thus secure all the fee; or, second, write to some patent attorney in Washington and offer him the case on condition that he will divide the fee with the aforesaid attorney-at-law. In either case, the inventor gets the short end of it.

If the attorney-at-law prosecutes the application himself, without the co-operation of a skilled patent lawyer, there are one hundred chances to one, that the inventor will secure a weak patent, or no patent at all. He will start the work by providing himself with a copy of the Rules of Practice of the Patent Office, and a few copies of patents. The attorney-at-law probably thinks that since he has drawn bills of complaint in matters of litigation, that he ought to have brains enough to prepare the specification in an application for patent. At any rate, he is willing to risk it, since a fee is involved, and he does not like to turn away the case. He does not realize that he may make an irreparable error during the course of prosecution, which would affect the patent even though it issues. But he proceeds to write out the specification and have the drawing made, and presents the application to the Patent Office. Of course, being unfamiliar with the practice, and wholly unacquainted with mechanics, and having no knowledge of the decisions of courts pertaining to patents, it necessarily follows that he makes a botch of his work. He does not know *what* to claim, and even if he did, he would not know *how* to claim it. He may secure the patent in time, and the inventor may never be any the wiser as to the scope of the patent; but the patent itself will always stand as a monument to the cupidity of the attorney, who was not honest enough to tell his client that he was incompetent to handle a patent case, and that he had better employ a skilled patent lawyer.

Suppose, however, that instead of trying to handle the application himself, the attorney-at-law sends it on to Washington, and associates with himself, some of the small-fry patent solicitors who are willing to take the case for one-half or one-third of the attorney's fee. That is to say, the non-resident attorney-at-law pockets one-half the fee for doing nothing, while the Washington patent solicitor gets one-half for doing all the work.

Of course, the non-resident attorney can only get some cheap man in Washington to do the work for one-half the usual fee, but he probably congratulates himself on his good luck in having selected someone who will relieve him of the burden of the work, and, yet enable him to retain one-half the fee for doing nothing. Here again, the interests of the inventor are lost sight of. It is plain that the Washington attorney holds no allegiance to the inventor, and is not going to spend much of his time in laboriously prosecuting the application to secure the allowance of broad claims, for a fee which is not commensurate with the work that is required to be done. The chances are that he will put just as much time on the work as will pay him for the fee that has been given him. Certain it is, that careful, conscientious and competent attention will not be given by any Washington attorney to a case sent by a non-resident attorney, where the latter pockets half the fee and doles out a miserable pittance to his Washington associate.

It is said that there are attorneys in Washington who will prosecute applications for patents to a completion, for a fee as low as \$3, and for preliminary examinations, which the outside attorney asks \$5 for, he can have made in Washington anywhere from fifty cents to \$2.50. Such business may be "money-making," but it is not conscience-elevating. Therefore, the advice we give to inventors is, not to deal with an out-of-town attorney who has not had an extended experience in patents. First of all, consult a patent attorney; and second, select the patent attorney who can prove to you that he satisfies his clients. The best patent solicitors reside in Washington. Most of the incompetent ones conduct their business outside of Washington, for the simple reason that if they were in Washington they could not exist. In fact, we have instances in mind, where draughtsmen and clerks who had never written a specification for a patent, going out West and starting in business as patent solicitors, professing experience in such work because of their residence in Washington. They could fool nobody in Washington, but they experience no trouble in playing on the credulous inventor away from this city.

There is nothing more important that an inventor should do than to make a proper selection in the matter of his attorney, and when he has done this, he ought to leave the business in his hands to prosecute as he sees fit. Furthermore, having found a good attorney, stick to him and do not go rambling about from one man to another. If you are wise you will follow this advice, as it is for the best interest of all inventors.

To keep themselves posted in the progress of the art in which they are interested, inventors and manufacturers should subscribe for the INVENTIVE AGE, which publishes a list of all patents issued each month. The low subscription price and the character of the publication, entitle it to the support of all the inventors of the country.

CLAIMS OF PATENTS.

Section 4888 of the Revised Statutes prescribes, among other things, that an applicant for a patent should "particularly point out and distinctly claim the part, improvement, or combination, which he claims as his invention or discovery."

Because of this fact, every patent must contain a claim or claims. Some patents have more claims than others. This is due in most instances to the novelty of the invention, but in many cases, it is influenced by the ability of the attorney. This is shown by the fact that the patents of certain attorneys always have more and better claims than the patents of other attorneys, because of the care and attention which has been given to the prosecution of the applications.

The main contention between the applicant on the one hand, and the Patent Office on the other, is over the construction of the claims. It requires no skill on the part of the attorney to obtain a patent 'anyone can do that. If an inventor is simply after a patent, there is hardly any use of employing an attorney, he can probably secure that himself without paying an attorney's fee; but, if he is desirous of securing protection, (and there no use of applying for a patent unless he is), he ought to avail himself of the skill of the competent patent lawyer.

The average inventor thinks that the more elements there are put in a claim, the stronger and better it is. Take as a familiar illustration, a typewriter. An inventor or attorney without experience thinks that if he draws one claim embodying all parts of the typewriter, he has everything covered; whereas, the simpler the claim is, the better it is. Suppose the first inventor of a typewriter had obtained a claim on a typewriting machine having a laterally movable carriage carrying the platen. Then all later inventions employing a laterally movable carriage having a platen would have been infringements of said patent. But suppose the first inventor had limited the claim to a "rotary cylindrical" platen. Then a later inventor who employed a platen having an oscillatory movement, would evade such a claim.

There is not a more difficult point for inventors to understand than the matter of claims of patents, and it is not easy to explain in a short article like this, but the general proposition may be advanced, that the fewer parts and the less number of words there are in a claim, the stronger and better the claim is. Furthermore, in drawing a claim, care should be selected to adopt words and terms which have a comprehensive meaning, rather than those which have a limited or restricted meaning. For instance, the word "movable" is a broader term than the word "swinging," and yet both might be used to describe the same thing. A gate moves, and it also swings; and yet the term "movable gate" would cover a "sliding gate," but the term "swinging gate" would not. Another thing that should be taken into consideration in drawing a claim of a patent, is the doctrine of equivalents as recognized by the courts. For instance, a spring is usually considered the equivalent of a weight, and *vice versa*. The courts in interpreting a patent will, in most cases, invoke the doctrine of mechanical equivalents. The only time when it will not do so, is when the claim has been purposely restricted in order to avoid some patent. In such case, it will never enlarge the scope of the claim so as to make it embrace that which was defined in the canceled claim.

SCIENTIFIC

PROGRESS.

New War Accessory.

The hyposcope is an instrument that is used in England, and is coming into employment outside of that country. It consists of a device which enables a man to shoot without being seen, and to spy out the land without exposing himself. This is regarded as by no means an insignificant accomplishment, for now the armies of the world are being taught that in the wars of the future, every device of concealment and of cover will be employed. The hyposcope may be further described as an instrument by the use of which a rifleman, remaining himself under bullet proof cover, and with nothing but his rifle exposed, may aim with perfect security and deliberation at an enemy who cannot possibly see him. With the growing range of rifles and the extension of the use of smokeless powder, war is losing all of its picturesque, if none of its deadly characteristics.

Paper Wheels.

People are accustomed to think of paper as a synonym of fragility, and it is hard to accustom oneself to the idea that it can be and is employed for articles of daily use, kitchen utensils, etc., much more to imagine it made up into a form that demands as hard and constant service as a wheel. The kind of paper employed for this purpose is calendered rye-straw board, and the operation is as follows: Two men standing beside a pile of the boards, brush over each sheet a coating of flour paste, until a dozen are pasted into a layer. A third man transfers this layer to a hydraulic press, where a pressure of 500 tons is applied. After solifying under this pressure for two hours, the twelve-sheet layers are kept in a drying room heated to a temperature of 120 degrees F. Several of these layers are, in turn, pasted together, pressed, and given another drying. This is kept up until a circular block is formed, containing from 120 to 160 sheets, varying from four and one half to five and one half inches in thickness, and as compact as seasoned hickory. The blocks are then turned in a lathe slightly larger than the tire, and a hole is bored for the cast-iron centre. In turning, the paper blocks make a shaving that resembles a strip of leather. The centre and the tire are forced on under a powerful hydraulic engine, and the wheel is ready for use.

Cooking by Electricity.

The culinary departments of ocean steamers contain many devices that would surprise cooks on land. The necessity for compression, for restriction of space on the transatlantic greyhounds, has led to the introduction of conveniences that may be ranked among the oddities of kitchen economy. On one of the largest and most modern of these vessels, the cooking is done entirely by electricity, so that there are none of the fumes and odors of wood, coal, petroleum, or gas clinging to the food when it is

served—a fact sure to be appreciated by travellers who are inclined to seasickness. In the kitchen of this boat, the little electric stoves are arranged in rows, in a manner somewhat resembling the keyboard of a typewriter. Each stove cooks a certain vegetable, meat, fish, soup, dessert, etc. The most curious device is the arrangement for boiling eggs. An ingenious mechanism automatically pushes the eggs out of the water as soon as they are boiled. This is without question the most up-to-date wrinkle in the line of cooking, and it will probably become popular in hotels and restaurants, as soon as its merits are realized.

New Anaesthetics.

"Somnoform" is the restful name given to a new anaesthetic, which was shown at the Medical Exhibition in London a month or two ago. One stall contained nothing but samples of the new liquid, the boiling point of which is 23 degrees below zero. The moment it comes into contact with the air, it becomes a gas. The demonstrator broke a glass capsule of somnoform to illustrate its character. As soon as the glass was chipped, there was a rush of what looked like steam, and seven pennyworth of somnoform was loose in the hall, trying to asphyxiate the onlookers. Its great virtue, from a medical point of view, is that breathing stops before the heart does, when it is administered.

Another anaesthetic, just discovered, is of the local order, and resembles cocaine. It is called "eucaine," and enables the performance of operations that are impossible with chloform. It will also permit the surgeon to take more time over his work. It is injected hypodermically at the place where the incision is to be made, and after a few moments the skin may be cut without causing the patient any pain. A recent operation in London, performed with the aid of this anaesthetic, lasted an hour and a half.

Device to Prevent Gasoline Explosions.

The extended use of gasoline for automobiles and motor boats, and its development in domestic service, renders of general interest a recent invention to prevent explosions of this inflammable material. This has always been the chief objection urged against gasoline—that constant vigilance is the sole price of safety, and that even a slight relaxation is sure to be followed by disaster. But a device recently tested in London is said to render all receptacles containing oil or gasoline practically secure from explosion. The invention is an application of the principle of the Davy lamp, used by miners, supplemented by a fusible cap or plug. If a vessel of ordinary type containing an explosive liquid be subjected to sufficient outside heat, or if the contents be lighted at the orifice, the walls of the tank will burst by the force of the explosion. At a exhibition given by the owners of the new patent, the Non-Explosive Device Company, a 20-gallon tank was partly filled with gasoline and placed upon a lighted bonfire. The fusible screw cap, made in two parts which were simply soldered

together, soon blew out, the solder having melted, and the ascending vapor caught fire immediately; but no explosion followed, because the orifice of the tank formed the upper end of a tube which projected down inside the vessel to its bottom, where it was closed. To allow the oil or gas to percolate from the interior of the tank, each of the metal layers of which this tube was composed had been perforated, and, while the perforations would permit the spirit to be poured out, they prevented the passage of the burning gas to the interior, by absorbing its heat as the wire gauze does in the Davy lamp. While the gasoline contained in the tube burned, the flame did not extend to the liquid or accumulated vapor in the half-full tank and, consequently, there was not sufficient expansive force generated to burst the tank. The flame was easily extinguished with a bundle of rags, and then lighted and put out several times. A motor car tank to which the device was affixed was lighted with a match, and extinguished at will. A gasoline can without the device exploded almost instantaneously when lighted.

The device applied to small gasoline cans, kerosene drums, and other petroleum containers would undoubtedly serve a desirable purpose.

Photography in Colors.

The goal of all photographers since the discovery of Daguerre—the production of pictures in colors—has been accomplished, according to a report from Paris. It has been heralded more than once in the last few years, but investigation revealed that the method involved technical difficulties and the results were unsatisfactory, no wide range of colors being at the command of the photographer. But the most recent discovery—which is credited to the joint efforts of an Austrian and a German—consists of a new paper, which has the extraordinary quality of filtering and of isolating colors. The paper, it is said, is covered with ten layers of appropriate chemical coatings. These layers are separated each from the other by coats of soluble gelatine. Each layer corresponds to the length of a certain light wave, or in other words, to a certain shade of color. The light waves, attacking the chemical layers more or less strongly, produce the colors. According as the waves are those producing red, blue, green, etc., their vibrations are more or less arrested in their passage through the layers. These chemical coatings might be likened to ten superimposed sieves of different calibers. If such different calibers should correspond to different sizes of grains of sand, it can be seen how the sand in passing through would in the end be fully sorted. This is the theory of the effect of the negative upon the new paper. According to its graduations—which in ordinary photography produce in printing only shades of black and white—the color waves of different lengths pass through it with different forces, and the paper collects and filters them. In actual operation, the use of the new paper is said to be easier and to involve less work than

with ordinary paper. It is to be hoped that the discovery will be less of a fairy tale than it seems, and that at last the reproduction of color has been attained. It will mean nothing less than a revolution in photography, if true.

Long-Distance Transportation of Meat.

Keeping meats good in a refrigerator by means of steam sounds like a contradiction; yet that is a method in vogue on the big steamers that carry meats from this country, and from Australia to Europe. Meats placed in refrigerators where the atmosphere is kept continually at an average temperature of from 30 to 40 degrees will remain fresh for an indefinite period.

The distance to Australia being greater than to the United States, the problem was a more serious one for the shippers from those British colonies than it was for us. After trying various expedients and experiments, some one thought of using steam to volatilize the gases which caused the trouble to the meat, and draw them off. A steam pipe was placed in a wooden duct at the bottom of a refrigerator chamber stored with meat. The gases of this kind are low-lying, and the duct led directly to the brine tanks. This experiment occurred at Sydney, and for eighty-nine days the refrigerator compartment was kept closed. At the end of this period it was opened, and the meat withdrawn and thoroughly tested. It was found to be as fresh and sweet—without the slightest suggestion of bone odor or mold—as on the day it was packed. The gases had been volatilized by the steam, carried off by the wooden duct, and the entire noxious condition purified by the brine tanks. With this aid to the refrigeration process, provided care be taken that the temperature never falls below freezing point so that the meat will not become frozen, meat may be kept for years, and yet be perfectly fresh when taken forth for consumption.

Case-Hardening Iron.

As is well known, in surface-hardening iron, it is heated to a bright red, sprinkled with prussiate of potash, causing it to cool to a dull red, and cooled with water. Another method is to heat pieces of horn, hoof, bone-dust, or shreds of leather, together with the article to be case-hardened, in an iron box, bringing it to a blood-red heat, and then immersing the article in cold water.

In a process recently patented by Carlo Larargese, of Rome, Italy, a mixture of charcoal and lamp-black is used which enables the case-hardening to be done in a much less time than with charcoal or other mixtures so far used, and at the same time obtains a better product. It has been found that the best results are obtained when the mixture is produced by carbonizing the bark of wild pine or other resinous woods in a closed crucible or retort provided with suitable means for the escape of the volatile gases, but so as to retain in the retort the lampblack produced by the resins contained in the bark or added to the wood. In place of the bark of wild pine, it is possible to use common wood with the addition of a suitable quantity of resin, mineral or vegetable oils, fats, or other hydrocarbons. The metal to be case-hardened is heated in contact with the described mixture, and then the heated metal is quenched in order to effect the case-hardening thereof.

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Engine.....C. W. Benn
Engines, Electrical sparking igniter for explosive.....A. J. Bradley
Engines, Safety spark shifting device for explosive.....R. B. Hain
Eraser.....H. B. Tooker
Excavating machine.....J. L. Scanlan
Explosive and making same.....E. Steele
Explosive compound.....W. M. Spore
Extension bracket.....D. M. Lewis
Eye, Artificial.....V. Fukala
Fabrics from cork and textile fabrics, Manufacture of compound.....J. Phillips et al
Fan, Centrifugal.....S. C. Davidson
Fastener.....E. F. Pridett
Fastener, Sew-on snap.....T. R. Hyde, Jr
Faucet, Bottling.....J. Metcalfe et al
Fence clamp, Wire.....J. C. Hollingsworth
Fence post driving machine.....W. H. Compton
Fence post, Portable metallic.....E. May
Fiber material to magazine rolls, Rolling up small strips of short.....R. Kron
Fibers, Solution for treating textile.....G. R. de Montford
File, Book.....H. McCormick
Fire alarm system, Telephone.....W. L. Denio
Fire extinguisher, Chemical.....W. S. Strowger
Fire extinguisher, Hand.....H. L. Burt
Fire lighter, Time.....E. M. G. Coleman
Fire arm attachment.....R. M. G. Phillips
Fireproof construction.....G. Dowman
Fireproof floor and ceiling construction.....T. O'Shea
Fluid pressure motor.....F. Fink
Fluid pressure regulator.....J. W. Scott
Fluids in drops, Appliance for delivering.....H. Kelsey
Flush tank.....W. A. & J. B. Henn
Flushing apparatus.....J. A. Vogel
Fly paper apparatus, Sticky.....T. D. Nostrand et al
Folding box.....A. L. Reynolds
Food product.....C. H. Campbell
Forge furnace.....H. L. Gantt
Form, Dress.....S. J. Secord
Formaldehyde apparatus.....S. Rauschenberg
Fountain and penholder.....J. G. Magin
Frost preventer.....J. W. Fulton
Fuel, Producing artificial.....C. K. Hollister, Jr
Furnace, &c., door.....J. H. Silley
Furniture joint fastening.....J. E. Faught
Fuse plug.....R. Hundhausen
Gage.....G. Arnold
Garment.....D. S. Steinberg
Garment, Combination.....E. C. Talcott
Garment hanger.....J. H. Post
Garment supporter.....B. C. Williams et al
Garters, &c. Gripping device for.....L. S. Greenberg
Gas conduit construction.....C. C. Gadd
Gas engine, Compound.....A. Leingartner
Gas furnace, Regenerative.....E. Derval

Gas generator, Acetylene.....N. Likins
Gas generators, Automatic feed mechanism for.....E. L. Ihle
Gas lighter, Time.....E. P. O'Neill
Gas machine.....G. C. Diehl
Gas, Manufacturing coal.....T. Settle et al
Gas producer.....L. Wilson
Gate.....M. Kolp
Gate fastening, Wire.....G. E. Klipping
Gate opening or closing device.....H. C. Moigan
Gear, Differential or double driving.....H. Austin
Gear, Mechanism for providing rotation and reciprocation from a single driving.....H. A. Houseman
Gearing, Feed.....J. B. Hart
Glass grinding machine.....2 pats. C. L. Goehring et al
Glass melting furnace.....G. H. Benjamin
Glass press.....A. S. Nichols
Go cart, Folding.....J. B. Rohrer
Governor, Marine engine.....J. Matthiesen
Governor valve for gas engines.....R. A. Mitchell et al
Grain binder knottor mechanism.....2 pats. P. Hanson
Grain drill.....W. Fetzer
Grain separator.....E. M. Kramer
Grain tank.....C. A. P. Turner
Grapple, Magnetic.....W. Reuter
Grater, Nutmeg.....F. E. Snyder
Grinding and polishing machine.....L. Schulte
Grinding machine.....E. A. Doolittle
Grinding machine.....C. H. Norton
Ham branding apparatus.....S. M. Blug
Harness, &c. Connecting means for.....W. S. Humphreys, Jr
Harrow.....J. F. Cross
Harvester, Beet.....H. E. Dally
Harvester, Corn.....O. S. Ellithorp
Harvester, Traveling.....F. S. Holley
Hay gatherer and loader.....J. T. Smith
Hay press.....C. E. Wehrenberg
Heater for hot water systems.....H. J. Long
Heating or cooling device, Air.....R. S. Lawrence
Heddle bar or support clamping device.....C. E. Nutting
Hide working machine.....A. A. Hutchinson
Hinge, Spring.....H. L. Hurst et al
Hitching weight.....G. Reddish
Horse hoof pad.....C. A. Ellis
Horsehoof detachable calk or creeper.....E. M. Coppock
Horsehoe pad.....C. W. Zaring
Hose coupling.....H. W. McGibbeny
Hose coupling.....J. L. Rehnstrom
Hose coupling.....G. W. White
Hose or pipe coupling.....S. N. Vernon
Hose supporter.....J. H. Pilkington
Hydrocarbon burner.....J. H. Herriff
Hydrocarbon burner.....C. W. Sponsel
Hydrocarbon motor.....L. Cordonnier
Hydrocarbon motor.....L. Cordonnier
Ice conveying apparatus.....H. Westergaard
Incrustation preventive.....L. R. Hurst et al
Incubator.....C. W. Zimmer
Induction coil vibrator.....R. Varley
Insulated or covered wires and machines therefor, Manufacture of.....C. Martin
Insulated rail joint.....G. A. Weber et al
Insulator rail joint.....G. A. Weber et al
Insulator, Third rail.....H. L. Fritze
Ironing table.....C. H. Potter
Isolone and making same, Homologues of.....R. Schmidt
Jar closure.....W. E. Bostwick
Joist shoe and anchor, Self releasing.....A. Carlson
Key selecting and striking mechanism, Electric.....A. J. Leonard
Knitting machine take up mechanism.....J. C. Brewin
Labeling machine, Bottle.....T. K. Keith
Lace fastening, Shoe.....F. B. Evans, Jr
Ladder, Extension.....W. H. Piper
Lamp, Electric arc.....G. Szuk et al
Lantern, Signal.....E. Corwin
Lathe apron.....W. Lodge et al
Leer.....W. McClintock et al
Lifting jack.....W. T. Bunn
Lifting jack.....J. R. Pearsall
Limb fastening device, Artificial.....J. E. Hanger
Liquid receptacle.....W. M. Fulton
Liquid receptacle indicator.....M. Bray
Liquids, Filling tube for.....A. Schneider
Loading or unloading device.....J. M. Duncan
Lock.....N. C. Gregory
Loom for weaving ornamental fabric.....W. G. Hartley
Loom for weaving pile fabric.....3 pats. W. G. Hartley
Loom, Hammock.....H. E. Ruddy
Loom shuttle automatic threading device.....reissue R. L. Cummock
Loom take up stop motion.....A. M. Marcoux
Loom warp stop motion.....H. Wyman
Lubricator.....O. E. Gay
Magnetic separation apparatus.....2 pats. C. Q. Payne
Magnetic separator separating cylinder.....C. O. Payne
Magnetically operated switch.....A. C. Eastwood
Mail box.....G. J. Massey
Mangle.....W. E. Andree
Manicure device.....E. Kaufmann
Measuring device.....S. B. Bowden
Medallion and match igniter.....F. B. Shepard
Merry-go-round.....M. Holtman
Metal wheel.....P. Hanson
Milkling apparatus.....A. S. Gerhard
Mine trap door and operating mechanism therefor.....A. T. Flint et al
Minerals by means of oil, Apparatus for the concentration of.....J. W. Van Meter et al
Molding machine.....H. G. Voight
Mop.....T. W. Davies
Motor control system.....G. H. Hill
Motor regulator, Automatic.....H. S. Meyer
Mowing machine.....R. G. Coates
Musical instrument pedal.....A. F. Norris
Net fastener, Fly.....E. Covert
Nitrocellulose, Purifying.....F. I. Du Pont
Nut, Axle.....A. Uren

Nut lock.....G. P. Finnigan
Oil burner.....L. A. Schulte
Oil can.....W. M. Fulton
Oil purifier.....D. H. McClelland
Oil storing means.....A. J. Smithson
Oiler.....F. E. Warner
Oiler, Hand.....J. F. Schiedt
Operating pad or receptacle.....C. W. Meineke et al
Oven, Baker's.....B. Ycre
Packet closure.....A. Tramezzani
Packing rings and slide valves in air brake triples and engineers' valves, Machine for grinding the.....G. M. Curran
Pad holder.....C. F. Birkenstamm
Paper box, Folding.....M. J. Kane
Paper machine suction apparatus.....P. C. McGrath
Paper making machinery.....H. Parker
Partition, Reinforced terra cotta.....P. H. Bevier
Pen.....J. M. Devoy
Pen cleaner, Ruling.....E. M. Zacharias
Pen, Double pointed.....J. G. Normann
Pen fountain attachment.....J. W. Langdon
Pen, Ruling.....G. Schoenner
Pencil sharpener.....C. F. Perkins
Pencils, &c. Machine for sharpening or cutting.....F. E. V. Baines
Photographic paper and films, Apparatus for printing.....A. W. S. Sanderson et al
Photographic printing apparatus.....2 pats. J. S. Cummings
Photographic roll film.....H. Fritzsche
Photographic shutter operating mechanism.....J. H. Hammer
Photographs, pictures, &c. Mounting.....R. P. Wheeler
Physical development apparatus.....K. L. Minges
Piano back.....G. H. Jones
Pianoforte action.....W. A. Earthy
Pictures, Apparatus for producing moving.....H. A. Farrand
Pie cutter.....I. Wray
Pile machine.....W. L. McCullough
Pile, Composite.....E. A. Smith
Pipe coupling.....H. O. Kelsey
Pipe coupling.....H. T. Merriam
Pipe coupling.....L. B. Post
Pipe joint, Flexible.....C. H. Weaver et al
Plant propagating apparatus.....R. S. Lawrence
Planter.....J. H. Groeters
Plow attachment.....A. Chase
Plow attachment.....B. B. Flinn
Plow scraping device.....J. Pluck
Plow standard.....T. B. Hardman
Plows, Foot lift for wheel.....C. R. Davis
Portable elevator.....J. Neubauer
Post lifter.....H. O. Rotvold
Potential regulator, Automatic.....W. S. Andrews
Press.....G. Engel
Primer.....C. A. Bailey
Printing forms, Electrotype or type carrier for.....E. Stine
Printing machine feed guide.....A. W. Otto
Printing press.....F. J. Herdle
Printing press throw out mechanism.....T. C. Dexter et al
Printing press throw out mechanism.....T. C. Dexter
Propelling ships, Means for.....W. Cochran
Puffing iron.....G. F. Hartig
Pulley of variable diameter.....C. Monin
Pulverizing rolls.....W. C. Davis
Pump controller system.....A. C. Eastwood
Pump, Rotary.....W. H. & G. W. Leiman
Punching machine.....J. A. Keyes
Racker, Beer.....F. Fink
Rail.....L. Steinberger
Rail end bridge.....E. E. Baldwin
Rail fastening device.....O. Granberg
Rail joint.....A. Vogel
Rail support.....L. Steinberger
Railway apparatus, Electric.....G. T. Woods
Railway cattle guard.....J. L. Wells
Railway crossing signal, Electric.....T. C. Clark
Railway gate automatic.....J. Walther
Railway joint nut lock.....J. J. Richardsou
Railway rail.....J. G. Allendorph
Railway safety signal.....W. S. Klingenberg
Railway signaling system.....M. A. Born
Railway tie.....L. J. Decker
Railway tie.....G. H. Kimball
Railway track gage.....J. M. Wagoner
Railway track structure.....E. Ott
Railways or tramways, Conductor and collector for electric.....D. Kempt
Railways or tramways, Contact box and conductor for electric.....D. Kempt
Range, Cooking.....R. S. Lawrence
Range, Steam.....H. J. Bishop
Reciprocating engine.....T. H. Phillips
Reference device, Tabular.....A. H. Merrill
Refrigerator, Well.....G. F. Charlesworth
Relay.....F. R. McBearty
Rest, Steady.....C. H. Norton
Ropes, Apparatus for automatically greasing hoisting or hauling.....P. Macadam
Rotary engine.....A. T. Stimson
Rubber, Regenerating vulcanized.....R. B. Price
Rule.....C. S. Fosselman
Sand cleaning apparatus.....W. S. Vanzant
Sand tempering apparatus, Molders'.....G. W. Packer
Sand, Tempering molders'.....G. W. Packer
Sash casing, Window.....H. Borgmann
Sash lock.....J. H. Moskow
Sash lock.....T. S. Alford
Saw clamp.....C. Bergstrom
Saw mill conveyer, Band.....D. C. Prescott
Scaffolding, Adjustable ladder.....J. F. Rouze
Scaffolding, Portable.....W. C. Goheen
Scrapers on agricultural implements, Mounting for rotary.....A. E. Watson
Screw driver.....S. E. Condon
Scrip meter.....G. E. Beach
Sea beaches, Device for reclaiming and retaining.....C. L. Landenberger, Jr
Sealing cap.....W. E. Heath
Separator.....R. W. Jessup
Sewage disposal system.....W. L. Church et al
Sewing machine needle vibrating mechanism.....R. L. Lyons
Sewing machine rotating hook.....R. Scharnberg

Sewing machine thread cutting device..... R. L. Lyons
Shade roller and curtain bracket..... C. Michaels
Shaft coupling..... C. W. Levalley
Sheet metal bending machine.....
..... E. G. H. Stein et al
Sheet metal can..... H. O. Reese
Shingle machine..... R. J. Thompson
Ships. Means for working..... W. Williams
Shoe cleaning machine..... J. T. Waters
Shutter, Curtain..... H. W. Locke
Shuttle brake..... J. Laforet
Sifter, Flour..... C. B. Comegys
Signal and switch trip..... C. M. Hurst
Signaling apparatus..... E. A. Fuller
Signaling system, Electric..... S. M. Young
Signaling system, Electric..... J. Dianovszky
Skirt and waist holder..... F. S. Boedfeld
Skirt supporter..... S. F. Nicolai
Slasher compression roll..... D. McTaggart
Slicer, Vegetable..... W. N. Dufford
Snow from railway tracks. Apparatus for removing..... D. A. Beaudette
Sound reproducing machine regulating mechanism..... B. C. Schulte
Spinning frame, Ring..... T. D. Harris
Spoke vise, Wheel..... T. D. Harris
Spring roller for screens, curtains, or awnings..... F. A. Mansell
Stacker, Straw..... J. B. Bartholomew
Stackers. Operating device for folding straw..... E. Huber
Stage flooding system..... G. J. Gibney
Staple puller..... G. W. Augus
Stave jointing and shaping machine..... R. G. Jayne
Steam engine..... G. S. Morison
Stoker, Automatic..... J. R. Luckey
Storage battery..... M. Schneider
Stove..... J. R. Herrick
Stove..... S. W. Jackson
Stove, Cook..... J. F. Billman
Stove tightener and fastener..... O. Anderson
Stump pulling machine..... W. Smith
Switch and signal track trip..... C. M. Hurst
Switch plate..... J. Alexander
Syringe, Hypodermic..... C. Witkowski
Table, bed, washstand, &c. Combination..... C. Reisch
Taping device..... J. F. Middleton
Target trap..... D. J. Schulte
Tea or coffee percolator..... C. E. Ziegler
Telegraphy. Receiver for wireless..... O. J. Lodge et al
Telephone call instrument..... E. W. E. Tompson
Telephone, Electric..... E. Gundlach
Telephone lamp jack..... H. P. Clausen
Telephone switchboard signal..... F. R. McBerty et al
Telephone switchboard signaling apparatus..... F. R. McBerty et al
Telephone switchboard supervisory signal..... J. L. McQuarrie
Ticket making and attaching machine, Pin..... F. Kohnle
Tiling for floors, &c..... J. H. Munro
Timepiece escapement..... A. J. Butts
Tire, Pneumatic..... G. Steinberg
Tire, Pneumatic..... T. Midgley
Tire, Rubber..... J. Holland
Tires. Machine for making outer castings for double tube..... F. A. Seiberling et al
Tobacco sample binding machine..... L. A. Pearson
Tool handle, Pneumatic..... 2 pats.
..... W. H. Keller
Tooth, Crown..... F. H. Davis
Trace fastening..... G. D. Lexner
Trace holder, Whiffletree..... J. E. Johnson
Traction engine..... W. M. Brown
Traction engine..... E. W. Stone
Traction wheel..... C. W. Kresse
Traveling hanger..... F. B. Cook
Trolley..... R. K. Orr
Trolley base..... P. D. Milloy
Trolley hanger..... M. M. Wood
Trolley wheel..... J. S. Briggs
Trolley wheel..... S. J. Haulin
Trowel, Scoop..... C. F. Hawksworth
Truck bolster..... F. R. Cornwall
Truck bolster..... W. H. Scott
Truck bolster or other beam, Car..... S. A. Crone
Truck bolster support, Railway car..... S. A. Bemis
Truck swing bolster, Railway car..... S. A. Bemis
Trunk..... F. Janis
Trunk catch..... J. P. Clark
Tunnel construction apparatus..... J. W. Reno
Turbine, Elastic fluid..... L. Wilson
Turbine, Elastic fluid..... 6 pats. J. C. Sturgeon
Type chase..... F. Kohnle
Type writer ribbon operating mechanism..... J. Alexander
Type writing machine..... W. H. Bennington
Type writing machine..... L. P. Diss
Umbrella..... H. Keller et al
Underreamer..... A. Willard
Underreamer and drill..... T. A. O'Donnell et al
Urethrotome..... W. E. Washburn
Vacuum lifter..... J. H. Sprague
Vacuumizing and double seaming machine, Automatic..... E. Norton
Valve..... S. S. Herrick
Valve..... A. G. Osgood
Valve..... E. H. Carroll
Valve, Actuating..... F. J. Donoughue
Valve device..... J. Lamb et al
Valve, Engineer's brake..... M. Corrington
Valve gear, Engine..... S. L. Berry
Valve mechanism..... G. Bowen
Valve, Reducing..... J. B. Bourseau
Valve, Reversing..... W. H. Hume
Valve, Stop..... A. C. Badger
Vehicle, Traction..... J. S. Walker
Velvet, silk, laces, &c. Apparatus for steaming..... J. A. Miller
Vending machine..... G. G. Sullivan
Vending machine, Coin operated liquid..... J. P. Muth
Violin tuning device..... W. Hutchins
Voltmeter switch, Multiple pole..... C. C. Badeau
Wad testing device..... W. L. Morris
Wagon coupling..... C. E. Keene
Wagon, Dumping..... J. F. Day
Wagon pull device..... W. W. Hopkins
Wagon top..... J. Pohlig
Waist..... L. R. Green
Waist, Self adjusting..... L. Fogus
Washing granular materials, Apparatus for..... G. M. Hoffman et al

Washboiler..... J. L. & J. L. Brobst
Washing machine..... B. A. Stocking et al
Water closets, &c. Flushing apparatus for..... J. H. Smith
Water elevator, Air expanding..... A. Bye
Water tube boiler..... W. C. Kendall
Weaving, Flexible looper for doup..... W. G. Hartley
Wells, Apparatus for maintaining a continuous flow of sand carrying oil from..... W. T. Cushing et al
Wells, Apparatus for promoting flow of oil and gas in..... F. Gardner
Wheel washer..... H. F. Diederich
Windmill..... J. L. Joyce
Window casement stay..... C. J. Fooks
Window, &c, fastener..... J. A. Belk
Window frame..... N. E. Parish
Window, Horizontally pivoted..... H. B. Hiteshew
Window lock..... W. E. Conner
Window lock..... J. T. Myers
Wire attachment, Earth or ground..... J. O'Connell
Wire connection, Feed..... G. L. Osborn
Wire stretcher, Feed..... W. R. Lott
Wire tightener..... T. J. Corrigan
Wrench..... A. M. Sanders
Wrench..... J. W. Todd
Wrench..... D. E. Lombard
Wrench..... L. Kules
Wrench..... C. U. Reams
Wrench..... W. Leach
Wrench..... S. M. Rowe
Wrench..... I. Weisnek

DESIGNS.

Belt, Waist..... L. Hauser
Cards, Back for playing..... S. N. Barker
Cards, Front for playing..... J. G. A. Fortier
Casket trimming..... W. E. Stevens
Chafing dish or casserole stand..... C. Rohlfis
Hat ornament..... 2 pats. C. Neubing
Lamp..... 4 pats. A. H. Humphrey
Mantel..... 2 pats. F. A. Broadbent
Mirrors, brushes, or similar toilet articles, Back for..... 4 pats. G. H. Berry
Pillow sham or similar article..... R. Zedler
Robe..... P. Bellisio
Silver, plated, or similar ware, Metal ornament for..... G. H. Berry
Souvenir brick..... H. J. Reynolds
Stove..... H. W. Beattie
Vehicle seat..... C. H. Davis

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Adjustable bit..... W. H. de Roseau
Agricultural boiler..... W. T. Marrs et al
Air brake..... J. H. Graham et al
Air brake..... 3 pats. W. O. Mundy
Air compressor, Hydraulic..... J. H. Alexander
Amusement apparatus..... W. S. Tothill
Anchor, Laud..... A. Castelin
Applicator..... E. E. Tope
Ashes, Apparatus for separating coal and coke from..... C. N. Paver
Autosleigh..... W. C. Wess
Balance leaf, Celluloid perpetual dial..... W. F. Dodsworth
Baling press..... H. Larose
Barrel closer..... H. L. Flanick
Battery plate..... H. C. Porter
Beadwork loom..... W. W. Dinwiddie
Bed, Sofa..... J. Christensen
Bedstead tray attachment..... H. B. Hales
Belt punching implement..... W. W. Woodley
Blinder, Loose leaf..... G. H. Gresham et al
Blotter holder..... H. T. Patterson
Bolster, Body..... J. Green
Bomb lance..... F. E. Brown
Books, &c. Ornamenting the edges of..... R. Miegel
Bottle, Non refillable..... G. W. Filbrun
Bottle, Non refillable..... A. Johnson
Bottle, Non refillable..... C. F. Rohwer
Bottle washing apparatus..... F. Goebel
Box or caddy cover..... A. J. Feild
Bracket and support, reissue, 2 pats..... H. F. Keil
Brake hanger, Non chattering..... R. C. Taylor
Bread cutting machine..... C. E. Poignant
Brick machine..... J. A. Cothran
Brick or tile die, Hollow..... A. Gillett
Briquette forming machine..... C. D. Jenkins
Brush cutter..... L. E. Gannett
Brush, Pneumatic..... E. B. Howell
Brush, Reservoir or fountain..... J. Ballance
Bucket elevator, Chain..... H. M. Barngrover
Burner..... F. W. Merrill
Button, Tufting..... F. A. Neider
Calculating machine actuating means..... F. P. McBerty
Callipers, Adjustable..... W. K. H. Woerner
Can filling machine..... J. C. Winters
Cane and stool, Combined..... M. F. Dougherty
Cant hook..... N. Blanchet
Car brake..... E. Williams
Car brake safety attachment..... J. B. Wright
Car door fastener..... C. W. Booth
Car drop door and operating mechanism..... D. C. Courtney
Car mover..... R. F. & J. E. Hageman
Car operating mechanism, Dumping..... S. J. Johnson
Car, Tank..... C. L. Rogers
Cars by hand, Device for propelling railway or tram..... H. J. Gehr
Carburetor..... J. Ruthven
Carrier frame, Folding..... A. H. & O. G. Berns
Carving machine..... H. Newhouse
Cash controlling apparatus..... R. & W. Schneider
Cash register..... C. G. Heyne
Caster..... G. W. Smith
Catcher, Automatic..... A. J. Maskrey
Cement block making machine..... W. F. Peeler
Chalk holder..... E. Johanson
Chatelaine, Watch..... A. Epple
Check holder..... R. A. Lachmann
Chocolate cream eggs, Dipping frame for..... J. Baessler
Churn and freezer, Combined..... J. R. Yarbrough
Circuit interrupter for jump spark coils..... C. H. Fischer
Clasp..... F. A. Neider
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Clay, Machinery for separating stone from..... A. Sabroe
Clip..... J. A. Mavers
Clothes line..... A. D. Moye
Clothes wringer..... W. Bulkeley
Coffin..... J. Donahue
Coin controlled machine..... P. E. Berger
Coin freed apparatus..... J. Jofeh
Comb..... C. E. Miller
Combing wheel..... F. L. Cross
Combustion regulating means..... 2 pats. J. M. W. Kitchen
Concrete piles, Forming..... F. Shuman
Condenser..... T. M. Eynon
Conductors, Safety device for strong current overhead..... C. C. van der Valk
Conveyer..... J. M. Edwards
Conveyer, Belt..... J. J. Ridgway
Cooking, Time indicating chart for..... J. B. Parnall
Core box, Green sand..... P. F. Woods
Crane..... C. Van Driessche
Cultivator..... M. & J. H. Jennings
Cultivator..... G. W. Roberts
Cultivator fender..... C. W. Whetstone
Cultivator shovels, &c. Clamp for..... W. Sobey
Current regulator..... J. B. Entz
Curtain fixture..... H. E. Keeler
Curtain fixture..... H. M. Sturgis
Curtain pole..... E. E. Bingham
Cutter..... E. J. Stewart
Decorating machine..... P. P. Faure
Defecating apparatus..... M. Altolaguirre et al
Dental chair arm rest..... A. W. Browne
Depth gage..... F. Soalding
Detector bar automatic cut off..... J. T. Hambay
Director, Telephone..... F. Drowns
Display fixture..... A. A. Braten
Dock pontoons, Pipe joint for floating dry..... N. A. Berner
Draft equalizer..... G. L. Englund
Draft equalizer, Reaper..... L. Krauss
Draw bar pocket..... R. Harding
Dredging machine anchor..... J. Sherwood
Dress shield fastener..... A. G. Swan
Dust arrester..... W. J. Newton et al
Dye and making same, Anthracene..... H. Weltz
Dye and making same, Blue sulfur..... E. Mathe
Dyes, Making sulfur..... A. F. Poirrier
Electric brake..... F. C. Newell
Electric circuits, Means for tuning adjusting..... F. Braun
Electric currents, Partial circuit for..... G. Thompson
Electric furnace..... C. P. E. Schneider
Electric light fixture..... G. H. Young
Electric lighting apparatus..... W. Knobloch
Electric motor controller..... W. N. Vance
Electric oscillation systems, Apparatus for determining the length of waves and observing the oscillations in..... J. Donitz
Electrical drive for centrifugals..... W. L. D'Olier
Electrode, Ultra violet ray..... C. F. W. Horn
Elevator door opening or closing device..... H. M. Jenkins
Elevator safety device..... B. Bremer
Embroidery hoop..... W. J. Reinhart
Engine feed mechanism, Explosive..... L. F. Washburne
Engine vaporizer and igniter, Oil..... N. L. & W. W. Tuck
Extracts by electricity, Apparatus for making..... G. D. Burton
Eyeglasses..... M. M. Kime
Fabric renovating apparatus..... G. Wassertheurer
Fan, Rotary..... G. M. Rudd
Farm gate..... D. Shields
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Faucet..... G. K. Cooke
Felting apparatus..... T. B. Flavell et al
Fence..... J. Pence
Fence clip, Wire..... J. W. Bodge
Fence stay wire tie, Woven..... E. E. Metcalf
Fiber material suitable for twisting and spinning, Manufacture of rolls of short..... R. Kron, Jr
Filter, Floating water..... 2 pats. J. Roche
Filter, Water..... F. A. North
Filtering boat..... J. Roche
Fire alarm apparatus..... L. Campbell
Fire walls, Means for flashing..... W. R. Rose
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Folding box..... Z. B. Webb
Folding box..... G. A. Bisler
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Fuel by distillation, Manufacture of artificial..... J. T. Davis
Fuel feed device, Pulverulent..... W. F. Wolfe
Furniture foot pad..... D. L. Miller
Fuse for armor piercing projectiles..... H. S. Maxim
Fuse, Shell..... 2 pats. C. P. Watson
Gage..... E. B. Shepardson
Garment stretcher and hanger..... E. C. Dedrick
Garment supporter..... F. Ferguson
Gas burner..... R. M. Bucknam
Gas generator, Acetylene..... S. Rushmore
Gas generator, Acetylene..... J. C. Waugh
Gas generator, Oil..... F. H. Bates
Gas generator, Water..... D. McDonald
Gas or vapor burner..... A. H. Arzt
Gas pipe cut off valve..... E. E. Eaton et al
Gas regulator..... G. T. Gamble
Gate..... J. Combs
Gate closer..... E. B. Rhodes
Gearing, Changeable speed..... G. M. Beard
Glass articles, Drawing..... J. A. Chambers
Glass, Drawing..... J. A. Chambers
Glassware, Making pressed..... O. A. Mygatt
Grading machine..... T. C. Caswell
Grain drill shoe..... J. A. Ranson
Grain dump..... F. Wilson et al
Grain elevator..... T. F. Hall
Grain lifter, Header..... J. Mees
Graphophone..... G. C. Holden
Handle fastening..... M. F. Mohr
Harvester reel..... G. L. Englund
Hat brim protector..... V. A. Wallace
Hat fastener..... J. J. Smith
Hay rack, Wagon..... J. T. Swan
Headlight, Locomotive or street car..... G. C. Fish et al
Heel for boots, shoes, &c. Rotatable or reversible..... J. Classen
Hide fleshing machine..... J. H. Sears
Hinge..... J. A. Slama
Hinge..... B. F. Burris
Hinge, Universal frictional..... F. E. Toitten

Holder..... S. J. Meyerlester
Hook and eye, Garment..... W. B. Riley
Horse cover..... J. L. Kitchen
Horse detacher..... F. L. Duncan
Horse detacher..... L. S. Morrow
Horse detacher..... J. P. Gardner
Horseshoe..... J. C. Higgins
Horseshoe..... W. O. Harmon
Horseshoe calk..... B. McKeazie
Horseshoe overshoe, Detachable..... W. O. Harmon
Hose carrying tongs..... J. M. Baker
Hose coupling..... W. E. Meredith
Hose coupling..... E. H. Gold
Hose coupling..... E. Schwamberger et al
Hose coupling..... J. Winkler
Hose coupling..... L. R. Nelson
Hose mender..... J. B. Marvin
Hot water generator..... H. Junkers
Ice, Apparatus for the production of..... W. E. Crane
Ice freezing plate..... W. J. Woodcock
Ice, Producing..... W. E. Crane
Ice tongs..... W. J. Woodcock
Indicator..... H. J. Rich
Insect collecting and destroying machine..... H. W. Steimann
Insulator or other bolts, Holding device for..... E. Bebler et al
Jar closure..... P. H. Kohler
Journal bearing, Compensating..... M. F. Stadtmuller
Journal box dust proof lid, Car..... W. P. Wescott, Jr.
Knife..... W. A. Rayment
Label cabinet..... A. Decker
Label holder and protector..... R. H. Trumpour
Ladder, Step..... H. L. Schwalbe
Lamp bulb and reflector, Composite incandescent..... O. A. Mygatt
Lamp extinguishing device..... G. O. A. Liebau
Lamp guard and stand combined, Electric..... J. C. Tudor
Lamp guard, Incandescent..... J. W. Matthews
Laundry marker..... W. H. Reed
Leather cutting machine, reissue, H. Parsons
Lenses, Apparatus for finding the axis and prismatic power of..... F. Hamilton
Letter sheet and envelop, Combined..... T. F. Archer
Lime sucrate, Apparatus for making..... K. Kuth
Load brake apparatus..... W. V. Turner et al
Load retaining stakes, Supporting and releasing means for..... D. McLaughlin
Loading and unloading apparatus..... A. R. Holmen
Loading or unloading apparatus sling..... O. W. Blodgett
Locomotive cab window cleaner..... R. A. Douglass
Locomotive water glass shield..... J. W. Mason et al
Loom filling detecting means..... J. Northrop
Loom for the manufacture of oriental carpets..... F. Boyer et al
Loom lay motion..... A. S. Cowan
Loom, Narrow ware..... F. Benz, Jr
Loom pile wire..... H. Hardwick
Loom shedding mechanism..... F. S. Berry
Loom shuttle..... A. Isherwood
Loom shuttle check..... B. F. McGuiness
Loom shuttle checking means..... I. Snow
Loom warp stop motion mechanism..... O. A. Sawyer
Lunch box..... M. J. Luce
Mail bag catching and delivering device..... J. Swihart
Mail bag catching and delivering device..... P. L. Neil
Manifolding apparatus..... G. H. Phelps
Marker, Land..... E. O. Doak
Measuring instrument, Recording electrical reissue..... E. Weston et al
Milk can..... J. B. Canover
Milk cooling and aerating device..... H. B. Ellsworth
Mining and excavating apparatus..... C. H. Thompson
Moistener for gummed surfaces..... T. M. Leslie
Mold..... M. T. Stevens
Motion, Device for imparting combined rotary and reciprocating..... J. Thomson
Motion feed lubricator..... C. P. West
Motor control, Pneumatic system for..... F. B. Corey
Motor control system..... F. B. Corey
Motor control system..... C. L. Perry
Motor engine..... J. D. Wheeler
Mower, Lawn..... W. P. Anthony
Mower, Lawn..... J. L. Sullivan
Mowing machine..... J. W. Latimer
Mowing machine swath cutting attachment..... J. Russell
Muffler..... I. B. Ulom
Music leaf turner..... W. Nossard
Music roll perforating device..... H. P. Ball
Music stand..... A. Krauth
Musical instrument..... S. W. Clark
Musical instrument tracker bar, Mechanical..... J. Courville et al
Nickel hydroxid, Recovering..... H. A. Frasch
Nut lock..... C. F. Degner
Oil burner, Crude..... E. N. White
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Oil, Electrically extracting essential..... G. D. Burton
Oil feeding device..... W. W. Mathews et al
Opera glass, Folding, reissue..... E. Batault
Ore separator..... 2 pats. H. A. Allen
Ore sizer and concentrator..... A. H. Phinney
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Ore treating apparatus..... H. A. Allen
Ores, Classification of the metallic constituents of..... A. E. Cattermole
Ores from gangue, Separation of the metallic constituents of..... A. E. Cattermole
Package carrier..... O. Leuschner
Packages from loose unpacked materials and unfolded wrappers, Producing wrapped..... O. N. Nord
Packing, Composition..... W. L. Gile
Packing, Piston rod..... T. S. Inge
Pad forming machine..... E. J. Stewart
Paper bag making..... D. Apol
Paper, Drying..... W. M. Barber
Paper knife..... W. H. Wright
Pasteboard making machine signaling device..... O. Mietaschik
Pavement making machine..... G. R. Wilton
Pen, Drawing..... G. R. Pyne
Photographic film washing and drying apparatus..... W. Cross
Photographic roll film..... F. Schmid

Piano action damper sustaining device..... A. Nickel
 Pile for use in forming concrete piling. Pre-
 paratory..... F. Shuman
 Pipe clamp..... H. Fishing
 Pipe connection. Soil and sewer..... W. F. J. Lutz
 Pipe joint..... J. A. McCulloch
 Pipe wrench..... W. A. Hostetler
 Piston cylinder..... R. Herman
 Pneumatic motor. Portable..... R. A. Norling
 Pole attachment..... C. F. Zimmerman
 Printing press feeder..... T. C. Merz
 Propeller. Boat..... F. J. Buzbee
 Propeller speed governor. Ship..... C. E. Miles
 Pump cylinder..... K. Stone
 Punch, &c..... F. E. Walden
 Radiator. Gas..... J. Hutchinson
 Radiator valve..... D. F. Morgan
 Rail plate and fastener..... W. V. Butterfield
 Rail tie and fastener..... J. T. Rohm
 Railway coaling apparatus..... E. A. Raasch
 Railway crossing. Street..... H. Currence et al
 Railway rail joint chair..... A. Saunders et al
 Railway road bed..... J. W. MacKenzie
 Railway switch operating apparatus.....
 M. D. Haulon
 Railway switch. Street..... A. E. Caughey
 Railway water column..... A. K. Mansfield et al
 Ratchet wrench..... B. H. Morrison
 Receptacle cushioning attachment..... A. C. Bundy
 Reflector for artificial lights. Shade.....
 O. A. Mygatt
 Register..... R. A. Brown
 Relay..... B. S. Smith
 Rivers, &c. Lining for beds and banks of.....
 E. Fichet
 Rock breaking machine..... T. B. Black
 Rod coupling..... J. Taylor
 Roll. Expandable..... J. H. Breck
 Rolling mill rolls. Apparatus for moving
 rails, &c., in relation to..... F. Mills
 Rotary engine..... J. W. Swanson
 Salt raker..... A. Johnson
 Salt raker..... A. Johnson et al
 Saponin and making same..... R. Kobert
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 J. W. Arnott
 Saw handle..... C. W. Byham
 Sawmill carriage auxiliary setting mechanism.....
 C. M. Smith
 Sawmill runaway carriages. Emergency stop
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 Saw set..... E. Caywood
 Saw. Steam power crosscut..... J. A. Reed
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 Scaffold..... C. Foster
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 Scaffolds. Erecting..... C. Foster
 Scraper..... J. O. Wagner
 Screw threading die..... A. M. Saunders
 Seam for metallic roofing..... F. J. Pioch
 Seam structure..... R. C. Sayer
 Secondary battery..... J. P. Clare
 Seed disk. Rotary..... M. Mitchell
 Seeder feeder..... F. L. Morgan
 Separating materials of different gravities.
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 Sewage treating apparatus..... W. J. Schweitzer
 Sewing machine feeding device. Book.....
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 Sewing machine for felling..... P. E. Kaufman
 Shade mounting..... J. B. Olsen et al
 Shaking machine..... B. S. Rowntree
 Sheet registering mechanism..... F. L. Cross
 Shelves. Adjustable step for book.....
 T. S. Martin
 Shoe fastener..... J. F. Haefele
 Show case. Vending..... I. Klayman
 Shutter. Focal plane..... W. F. Folmer
 Sieve. Adjustable..... C. Closz
 Soldering iron. Self heating..... W. P. Bartholow
 Sounds and optical impressions. Apparatus
 for recording and reproducing..... F. Schaefer
 Speaking tube..... B. M. Graybill
 Spinning frame separator mechanism.....
 2 pats..... H. K. Smith
 Splicing ring..... W. H. Burnham
 Spread roller..... T. Lee
 Spring..... H. H. Arnold
 Stacker chute. Pneumatic..... W. E. Jones
 Stacker. Pneumatic..... O. L. Larson
 Stairway. Moving..... C. R. Pratt
 Stamp tappet and securing means therefor.....
 C. Brown et al
 Standard. Adjustable..... E. S. Bryant et al
 Steam cleaner..... M. S. Ellis
 Steam generator..... G. Farrel et al
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 Steam generators. Prevention and removal of
 incrustation in..... W. Gawlikowski
 Steam shovel..... G. E. Turner
 Stone composition. Artificial..... P. Walther
 Storage battery..... H. C. Porter
 Strap covering machine..... V. P. Buck
 Stud or post. Metal..... C. Haines
 Sucker rod cleaner..... W. L. Carlin
 Surfacing device..... H. A. Hill
 Surgical or operating pad or cushion.....
 C. W. Meinecke et al
 Switch stand..... M. W. Long et al
 Switch stand..... M. W. Long
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 Tapping machine. Thread..... H. M. Wilson
 Teaching apparatus. Music..... C. L. Dunning
 Telegraph transmitter..... J. F. X. Trotter
 Telephone exchange connection counter.....
 reissue..... C. E. Scribner
 Tenement. Two-story..... N. R. Grimm
 Tennis racket..... J. E. H. Hyde
 Tent rope slide and grip..... W. S. Logan
 Threading device. Automatic..... R. L. Cumnock
 Threading tool. Inside..... R. McNeill
 Ticket. Railway..... J. Buffington
 Ticket. Transfer..... W. Klein, Jr
 Tile making machine..... L. Davis
 Tiles. Making mosaic..... H. C. Mercer
 Toilet apparatus. Combination..... 2 pats.....
 H. S. Hale
 Toy cannon..... J. F. & J. Corr
 Toy inclined railway..... W. R. Austin et al
 Tricycle..... C. J. Madonna
 Trolley track rail..... W. H. Spiller
 Trolley wheel. Ball bearing..... J. A. Norton
 Trousers leg mud guard..... D. J. Terzian
 Truck. Car..... J. C. Barber
 Truck. Elevating..... A. A. Scott
 Truck garment supporter..... M. N. Drucker
 Tubing. Flexible metallic covered. T. Smith
 Type writer type bar mechanism..... F. X. Wagner

Type writer ribbon reverse mechanism.....
 F. X. Wagner
 Type writing machine..... N. L. Anderson
 Type writing machine paper carriage.....
 J. H. Dorman
 Umbrella cover holding clip..... W. W. Climeson
 Umbrella handle. Detachable..... B. Rothschild
 Universal joint..... J. A. Tilden
 Valve..... F. Stahl
 Valve. Balanced slide..... A. D. & C. L. Dunbar
 Valve. Engine..... R. A. Norling
 Valve. Feed..... J. L. Curran
 Valve for irrigation stand pipes, &c.....
 G. Kellar et al
 Valve for oil tanks, &c. Air..... F. Robinson
 Valve for portable pneumatic motors. Trottle
 R. A. Norling
 Valve for rain spouts. Automatic.....
 J. H. Kochenderfer
 Valve gear. Shifting eccentric..... F. J. Waters
 Valve. Stop..... J. Robinson
 Vault. Safe deposit..... T. Rauschenbach
 Vehicle brake..... H. G. Ecken
 Vehicle spring shackle..... J. C. Swan
 Vehicle wheel..... J. A. Brennan
 Vending machine..... W. S. Filley
 Vending machine..... G. F. Hochriem
 Vending machine coin operated mechanism.....
 J. Jonson
 Viscose. Purifying..... C. F. Cross
 Vise, &c..... F. E. Waldeu
 Vise. Adjustable bench..... P. Broadbooks
 Vision. Instrument for detecting and correct-
 ing defective..... F. M. Bishop
 Washine machine..... B. B. Rieder
 Water closet..... F. W. Bender et al
 Water closet hopper soil pipe connection.....
 A. F. H. Bode
 Water elevator..... J. A. Elliott
 Waterer. Stock..... F. S. Seymour
 Weaner. Colt or calf..... J. F. Etchison
 Web cutting, printing, and folding press.....
 C. A. Tripp
 Weighing machine. Automatic..... F. A. Boland
 Weighing machine. Weight registering.....
 H. Pottin et al
 Well machine..... 3 pats..... M. G. Bunnell
 Wheel..... C. W. Salisbury
 Whiffletree hook..... J. J. Moore
 Winding and rewinding mechanism.....
 O. F. Hintz
 Windlass..... O. L. Larson
 Windmill attachment..... R. Balgmann
 Window..... O. Frotcher
 Window frame..... H. T. Whitenack
 Window frame..... H. L. Hoyer
 Window screen..... H. F. Chreitzberg
 Window strip..... H. D. Aupke
 Window ventilator..... G. S. Myrick
 Wire. Vehicle attachment for taking up and
 distributing..... J. S. Brandon
 Wood, &c. Machine for reducing..... J. M. Nash
 Wort. Means for controlling the aeration of
 fermenting..... D. O. Paige
 Wrench..... C. D. O'Neil
 Wrench..... E. B. Randall
 Wrench, &c..... F. E. Walden
 X-ray apparatus..... W. B. Churcher

DESIGNS.

Belt. Waist..... L. Hauser
 Brooch or similar article..... E. C. Abel
 Doily or similar article..... J. W. Catty
 Hammock..... I. E. Palmer
 Lavatory..... 3 pats..... F. J. Torrance et al
 Metallic articles. Border for..... L. W. Rice
 Mirrors or similar articles. Back for hand.....
 S. A. Keller
 Nail files or similar articles. Handle for.....
 S. A. Keller
 Rug..... 3 pats..... G. M. Gillies
 Rug..... J. A. Gillies
 Rug..... H. A. Miller
 Rug..... G. W. Perkins
 Rug..... R. D. Stevens
 Show case..... 2 pats..... J. T. Robin
 Sink. Kitchen..... E. F. Gregg

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 E. E. Magoris
 Acid proof composition..... F. A. Pank
 Adding and recording machine..... W. H. Pike, Jr
 Adjustable bracket for mirrors, &c.....
 F. Eble et al
 Air brake apparatus..... O. A. Alexander
 Alarm device..... E. L. Fitch
 Aluminium. Electrolytic manufacture of.....
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 Attaching and detaching device..... W. A. Alexander
 Audiphone..... C. J. Massinger
 Automatic coupling..... T. W. Lukens et al
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 Automobile..... D. Lacoin
 Axle. Vehicle..... J. B. Baynes
 Bag frame..... B. vom Eigen
 Bake pan..... J. A. Bailey
 Baling press..... W. H. Kauffman
 Bar which cannot be sawed through.....
 P. D. Ziegler
 Barometer. Aneroid..... F. E. Collinson
 Barrel hoop. Wire..... J. F. Pool
 Barrel rack..... A. A. Charlebois
 Basket..... E. L. Walker
 Basket. Grape..... E. L. Walker
 Basket handle. Detachable..... E. L. Walker
 Beating engine bed plate..... S. R. Wagg
 Bed. Folding..... H. Brandt
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 Block molding machine..... L. P. Normandin
 Block signal. Automatic electric..... W. A. Luby
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 Boat..... C. A. Manker
 Boiler check..... A. B. Haller
 Book binding..... C. Chivers
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 Book protector..... S. L. Greene
 Boot or shoe..... K. Engel
 Boot tree. Inflatable..... H. G. Hoyos
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 Bottle..... E. E. Lewis
 Bottle filling machine..... W. F. Fanning
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Box fastener..... D. A. Schnabel
 Brake and mud guard. Combined..... F. L. Fisher
 Brewing kettle, hop jack, tank and cooker.
 Combined..... C. F. Hettinger
 Brick drier. Moving..... I. P. Armstrong
 Briquet machine..... F. Meyer
 Broom heads. Making..... S. J. Edmiston
 Bucket. Lifting..... P. C. Hains et al
 Bucket. Well..... C. A. Crane
 Building block forming machine..... W. Raab
 Burial casket, &c. Handle for..... 2 pats.....
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 Burner..... P. B. Curran
 Button..... C. Schmidt
 Calipers..... J. T. Lemon
 Can caps or seals. Tool for locking.....
 H. A. Triesdale
 Candle extinguisher..... G. Stevenson
 Cap. Convertible tourist and automobile.....
 R. Fox
 Car chock..... J. W. Aregood
 Car door. Grain..... W. A. McGuire
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 Car. Flexible wheel base..... G. L. Stuebner
 Car guard rail. Street..... J. J. Collius
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 Car roof. Metallic railway..... J. J. Souder
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 als. Separating..... J. D. Darling
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 Carbonating apparatus..... A. Heymann
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 Carpet fastener..... W. Haussler
 Cellulose. Converting wood..... W. F. Ewen et al
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 A. L. Ginter
 Cement derived from ashes and making same.....
 M. W. Marsden
 Certificate of deposit..... A. W. Moore
 Chafe iron. Roller..... T. H. Brady
 Chair..... F. Bennett
 Check cancelling press..... A. Dietze
 Chest protector..... C. Uebel
 Christmas tree holder..... J. C. Chenot
 Chuck..... G. R. Rich
 Churn..... C. Y. Roberts
 Churn..... S. C. Lavender
 Circuit closing device..... A. B. Chance
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 M. W. Phillips
 Clock chiming and repeating mechanism.....
 C. A. Jacques
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 Clothes pin..... A. F. Pickert
 Coal sieve or separator..... J. G. Brock
 Coat and hat hanger..... M. H. & B. F. Burton
 Coherer..... W. S. Hogg
 Coin receptacle..... H. P. Townsend
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 Coke oven. Electric..... M. R. Conley
 Colors. Preparation of salts of iron for use in
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 Concentrating table actuating mechanism.....
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 Condiment holder..... I. W. Livingston
 Continuous kiln..... P. L. Youngren
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 Cop cutting mechanism..... T. Hansen
 Copper sulfate. Making..... G. Gin
 Cord cutting and shocking machine.....
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 Corn husking machine husking roller.....
 E. A. Johnston
 Corn shock binding device..... W. J. Nicholson
 Corn shock loader..... D. T. Phillips
 Corn shock or hay loading or stacking appara-
 tus..... J. Peterson
 Cotton blending and cleaning apparatus.....
 C. B. Sample
 Cotton cleaner and gin feeder..... J. W. Gooch
 Cotton picker. Pneumatic..... R. Getzlaff
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 Coupling pins in couplings. Device for hold-
 ing fractured..... W. O. Harlow et al
 Crank motion. Variable..... E. E. Emerson
 Crate for berry boxes, &c. Folding.....
 E. L. Walker
 Cremating furnace..... W. Horsfall
 Cross tie..... E. J. Johnson
 Cuff holder..... E. E. Dean
 Culinary utensil..... C. Canciani
 Cultivator..... S. W. Rowell
 Cultivator. Motor driven..... E. Imperiale
 Current motor. Alternating..... M. C. Massie
 Curtain fixture. Window..... C. E. Heinrich
 Curtain pole..... W. M. Black
 Curtain pole. Self supporting..... C. Benson
 Curtain ring..... A. L. Parker
 Cutter..... T. B. Miller
 Cutting tool..... A. E. Venn
 Damper regulator. Stove..... J. R. Reed
 Decorative light..... H. Sax
 Deflections. Apparatus for reading angular.....
 P. H. Wynne
 Dental plates. Swaging or fitting..... A. L. Fisher
 Dental tool guard..... R. L. Magoon
 Desk or writing table attachment. School.....
 J. C. Gilson et al
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 Diseases. Cabinet for treatment of hemorrhoids
 or other..... B. F. Johnson
 Dispensing vessel..... J. G. Lowe
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 Drapery hook..... L. Nachmann
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 Drawer guide..... W. Laakso
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 Duplicating machine..... C. H. Colter
 Dye and making same. Orange tetraxo.....
 K. Jedlicka et al
 Dyeing composition..... G. M. Lawton
 Easel..... E. C. Entler
 Eaves trough hanger..... C. S. Wolford
 Educational device..... O. H. Powers

Electric battery..... P. J. Kamperdyk
 Electric fixture support for outlet boxes.....
 W. F. Bossert
 Electric lightning system for vehicles.....
 J. A. Little
 Electric machinery control. Dynamo.....
 E. R. Carichoff
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 Electric switch..... W. S. Tobie
 Electric transmitter..... A. J. Mundy et al
 Electrical exchange. Automatic.....
 F. A. Lundquist et al
 Electrical uses. Resistance for..... J. F. Tracy
 Elevator..... G. Visco
 Elevator doors. Locking and interlocking at-
 tachment for sidewalk..... P. H. Jackson
 Embossing press attachment..... H. G. Turner
 End gate. Wagon..... C. E. Byington
 Engine cylinder. Steam..... L. R. Alleman
 Engine drum. Hoisting, derrick, or similar.....
 A. E. Norris
 Engine exhaust muffler. Explosive..... D. Ogden
 Engine lubricating apparatus..... E. D. Caldwell
 Envelop..... E. Z. Wauous
 Envelop. Safety..... H. Rueve, Jr
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 Eyeglass nose guard..... G. J. Kirby
 Fabric cutting machine..... F. A. Seiberling et al
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 Faucet. Two way..... S. S. Williamson
 Feed water supply regulating apparatus.....
 J. Davie
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 Fence gate..... G. H. Harman
 Fence stay clamp. Wire..... P. B. Yeider
 Fence. Wire..... W. M. Wadzeigh
 Fence wire tightening device or tool.....
 F. Vogelzang
 Fertilizer..... E. F. Wright
 File. Cabinet or index..... A. E. Walker
 File or rasp cutting machine..... H. Crane, Jr
 Film developing machine..... J. M. Brainerd
 Filter beds. Apparatus for removing material
 from the surface of..... H. W. Blaisdell
 Fire shutter..... P. Ebner
 Firearm ejector mechanism..... E. Beach
 Firearm removable joint pin..... A. H. Day
 Fireproof ceiling..... H. Schmidt
 Fireproof floor and ceiling construction.....
 H. & C. D. Oliver
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 Fishing gaff..... M. F. Cook
 Fluid shut off..... W. & J. Boekel
 Fluid switch..... N. H. Medbery
 Flushing drains and sewers. Means for.....
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 Folding chair..... A. J. Jackley
 Folding gate..... J. Guerin
 Folding machine..... C. A. Surtevant
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 S. Januliewicz
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 Garment clasp..... reissue..... M. Coffey
 Gas burner. Incandescent..... L. T. Alton
 Gas check..... F. Gieger
 Gas generator..... P. Meyer
 Gas generator. Acetylene..... W. W. Cozins
 Gas generator. Acetylene..... A. V. Sanford
 Gas making apparatus..... C. M. Baker
 Gas producer..... P. J. Buckley
 Gear. Transmission..... F. G. Gies
 Gear. Two speed reversing..... F. A. Ferguson
 Gearing for the transmission of power. Wheel.....
 G. S. Baker
 Glass drawing machine..... J. E. Berry
 Glass grinding machine work holder.....
 F. J. Starr et al
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 E. W. Bryce
 Glass sheets. Apparatus for making.....
 J. Proeger
 Glove. Decoration..... P. Doppenschmitt
 Glove washing form..... C. Kreil
 Gold dredging machine tumbler..... W. Ferris
 Governor. Engine or like..... J. Taylor et al
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 Grain separator..... S. A. Furman
 Grating. Safety..... G. T. E. Henriksen
 Grinder. Wet..... J. J. Rexroth
 Grindstone fixture..... T. P. Ellis
 Gun sight..... A. M. Andrews
 Hair drier..... D. J. Buckley
 Hair retainer..... J. E. Daughters
 Handle..... J. M. Parmenter et al
 Harvester..... C. Hesse
 Harvester attachment for raising and saving
 down grain..... W. M. Wadleigh
 Harvester. Corn..... W. V. Phillips
 Harvester. Corn..... E. L. Schanck
 Harvester. Corn..... D. T. Phillips
 Harvester tongue truck..... E. A. Johnston
 Harvesting, binding and shocking machine.
 Corn..... D. T. Phillips
 Harvesting machine grain elevating device.....
 A. Castelin
 Hat fastener..... C. Dorn
 Hatch cover..... R. R. Lacey
 Hat frame loader or unloader..... J. B. Young
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 Headlight..... F. C. & G. L. Wilson
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 Hose coupling..... J. A. Allen
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 E. Kramer
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- Internal combustion engine.....H. C. Waite
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Jewel mounting.....A. A. Boismaure
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Key guard.....A. Morell
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Lace tipping machine.....O. A. Albrecht et al
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Lantern globe mold.....A. B. Houghton
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Lathe templet controlled turner.....J. Hartness
Leather press.....M. A. Holmes
Life preserver.....A. Tann
Lightning arrester.....G. Babcock
Lightning rods. Apparatus for demonstrating the efficiency of.....H. Simpson
Linotype machine.....P. T. Dodge
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Lock for levers in interlocking machines.....J. P. Coleman
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Loom. Filling replenishing.....W. I. Stimpson
Loom. Hand.....S. H. Woodbury
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Loom stop motion.....J. M. Grey
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Loom warp puller.....A. Petersen
Lubricating device.....A. G. Elvin
Lubricating oil. System for distributing and filtering.....C. E. Lefebvre
Lumber matching machine pressure attachment.....A. Milne
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Minerals. Separation of.....G. A. Goyder et al
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Music transposition chart.....W. H. Finley
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Nitramins with formaldehyde and a product thereof. Reacting on.....B. Homolka et al
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Nut lock.....C. A. Kocob
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Ore concentrating table 2 pats G. A. Overstrom
Ore separator and concentrator.....C. Van Hoesen
Overalls.....J. Landers
Overshoe holder.....J. Stawartz
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Pail. Dinner.....H. Sobey
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Paper feed roll mechanism.....S. J. Seifried
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Pin tongue.....D. A. Seligman
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Railway crossing gate.....J. Vernet
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Railway signal.....J. P. Coleman
Railway signaling means.....H. A. Johnson
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Railway wagon balance.....N. Jeppsson
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Rotary motor.....J. Pattinson
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Sound collecting and magnifying device.....C. H. Viggars
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Gas pressure regulator.... R. A. Gillespie
Gas producer superheater.... A. B. Duff
Gas service pipes. Antifluator for.... J. E. Broderick
Gas washer.... O. N. Guldlin
Gases. Separating mechanically entrained globules from.... T. A. Edison
Gear wheel.... V. W. Mason, Jr
Generator and combustion chamber. Combined.... H. Ragot
Glass. Manufacture of.... S. O. Richardson, Jr
Glass melting furnace.... W. T. Nicholls
Governor. High speed engine.... E. A. Edwards
Grain bin drying apparatus.... A. R. Hagner
Grain separator.... F. L. Lewis
Grain treating apparatus. Seed.... A. M. Haldaway
Grapple.... W. A. Duncan
Grate bar. Hollow blast.... J. A. Willard
Griddle and turner. Pancake.... W. A. Saunders
Grinding mill.... A. H. Patch
Grinding or polishing machine.... W. V. Robinson
Grip. Telescopic.... F. H. McGowan
Gun with protecting shield offset from the trunnions. Transportable.... O. Lauber
Hammer. Self-feeding.... J. W. Thompson
Harness tree seat.... R. Miller
Harvester.... A. D. Reynolds
Hat stand. Milliner's.... H. D. Oliphint
Headlight. Locomotive.... E. A. Edwards
Heater.... H. F. Hoeman
Heater and ventilator.... J. W. Johnson et al
Heating system for greenhouses, &c.... C. C. Peck
Heating systems. Measuring heat in hot water.... C. C. Peck
Hinge. Double swing door.... H. J. Wright
Hinge. Gate.... F. L. Smith
Horse ice creeper.... C. W. Bolton
Horseshoe.... M. M. McCain
Hose coupling.... C. H. Zessin
Hose coupling.... F. Sweed et al
Hose pipe coupling.... C. A. G. Storz
Hose supporter.... L. O. Pullen
Hose supporter and suspenders. Combination.... C. W. Thompson
Hydraulic apparatus. Means for controlling.... W. Astfalck
Hydraulic press.... 2 pats.... E. Crowe
Implement fastening device.... C. Ehrenfeld
Incandescent mantle burner.... V. H. Silnick
Index.... R. Bogue
Indicator.... G. A. Browne
Indicator or display apparatus.... W. J. Baker
Insect exterminator.... J. J. Hanus et al
Insects from plants. Machine for collecting.... W. M. Bolen
Insecticides. Making.... J. P. Wickersham et al
Insulated rail joint.... G. A. Weber
Insulating support for electric third rails.... F. R. Slater
Jointer knife guard.... A. Uetz
Journal box dust guard.... T. H. Symington
Journal box. Railway.... 2 pats.... T. H. Symington
Journal lubricator. Car.... A. Weaver
Kindling compound and making same.... M. Perry et al
Knitting machine stop motion.... A. Blanchard et al
Lace fabric. Woven.... A. Ronsdorf
Lace fastener. Shoe.... W. H. Jaxheimer
Lamp.... E. E. Taylor et al
Lamp. Electric arc.... A. Blondel
Lamp heater support. Nerst.... H. N. Potter
Lamp supporting bracket.... F. Clark
Lamps. Glow support for second class conductor.... H. N. Potter
Lasting jack.... H. S. Griffin
Latch. Gate.... H. K. Smith
Latch. Gate.... W. J. Donovan
Lath stripping machine.... N. H. Bolton
Lath carriage automatic stop.... N. D. Chard
Lath. Pipe threading hand.... J. P. Bond
Lath tool holder.... J. S. Henry
Letter drop signal.... M. S. Field
Letter or figure dies. Producing interchangeable.... G. White
Level.... J. L. Wilcox
Linotype machine.... P. T. Dodge
Linotype machine.... D. S. Kennedy
Linotype machine assembling mechanism.... J. Funaley
Lock.... W. E. & O. F. Sparks
Lock.... A. F. Mayer
Loom dobbie leno motion.... C. B. Arnold et al
Loom for weaving slat blinds.... A. C. Hough
Loom. School.... E. Lindberg
Loom shuttle filling carrier.... W. I. Stimpson
Loom. Weft replenishing.... H. Wyman
Lumber drying kiln.... C. B. Hall
Mail box.... C. Gray
Massage apparatus.... J. U. & G. Jones
Match lighting attachment.... G. C. Harrison
Match package.... J. A. E. Criswell
Mattress filling machine.... F. A. Rice
Measuring the duration of combustion of powders. Apparatus for.... A. Ciolfi
Mechanical movement.... H. Brammer
Metal cutting tool. Rotary.... W. H. McKenna
Milk bottles, &c. Apparatus for cleaning and sterilizing.... C. S. Adams et al
Milk powder. Dried.... J. A. Just
Mixing and cleaning machine. Convertible.... J. W. Stacey
Mold.... H. N. Jasper, Sr
Monkey wrench.... C. L. Verac
Motor control system.... J. B. Linn
Motor generator sets. Means for controlling the division of load between synchronous.... J. E. Woodbridge
Mount for thin, fragile articles.... W. D. & R. W. Denton
Mowing machine pitman.... A. L. Brandt
Mowing machine side delivery burner.... J. J. Thornburgh
Multitubular boiler.... J. B. Prudhon
Music playing instrument. Mechanical.... F. C. White

Musical instrument controlling sheets. Reversing and speed regulating device for.... W. F. Cooper, Jr
Nut lock.... W. H. H. Beckett
Oil generator. Crude.... J. M. Kroyer
Oil or distillate. Desulfurizing.... O. P. Amend
Optician's pliers.... J. H. Starbuck
Ore washer.... F. H. Frankenberg
Paper holder and cutter. Roll.... M. McMahon
Paper. Machine used in the manufacture of.... D. N. Bertram et al
Paper milk bottle.... J. C. Kimsey
Pen. Fountain.... A. Eberstein
Penholder.... L. Lemos
Pencil.... H. Spengler
Perforating machine.... J. B. Allen
Phonograph record edging machine.... W. H. Miller et al
Photographic negatives. Printing from.... F. C. White
Photographic shutter.... 2 pats.... M. A. Richter
Photographic shutter.... E. R. Bullard
Piano hammers. Machine for making.... E. T. Wolf
Piano sounding boards. Table for making.... A. Dolge
Picture mounting leaf and book.... A. W. Engel
Pipe coupling or connection.... F. W. Carlson
Pipe hanger.... H. Kriebel
Pipe stand.... B. C. Newlove
Plant support.... R. Y. Kessler
Planter.... A. D. Ezell
Planter. Corn.... H. Schlicht
Planter. Corn.... L. P. Graham
Planter. Cotton.... J. W. Cheatham
Planter. Cotton.... I. Guyton
Planting machine.... S. H. Tinsman
Plow.... J. L. Scoggin et al
Plow. Ditching.... P. Skelly
Plow. Hand.... G. M. Hanger
Plow. Mechanically worked.... R. H. Fowler, et al
Plow. Reversible.... E. J. Wilson
Poke. Animal.... C. R. Nichols
Pole hoister.... G. R. Dodd
Popcorn balls, &c. Machine for making.... R. E. Hunt
Post office furniture.... J. J. Marsh
Powdered materials. Machine for distributing.... J. F. Byers
Power from a single prime mover, &c. Apparatus for utilizing.... H. Laughlin, Jr
Power transmission device.... W. A. Harvey
Power transmitting device.... I. Deutsch
Power transmitting mechanism for boats, &c.... E. E. Anthony
Presser foot and attachment.... S. Laskey
Pressure gage.... G. Spencer
Printer's form registering device.... W. J. Taplin
Printing machine. Plate.... J. P. Stevens
Printing machine. Rotary stencil.... A. B. Dick
Printing press numbering attachment.... C. G. Harris
Printing press. Platen.... R. R. Williams
Propeller. Steamboat.... W. S. Baker
Printing spears.... C. F. Crosby
Pulverizer and grader.... J. W. Boileau
Pump. Hydraulic motor.... J. H. Spencer
Pump. Mercury.... H. N. Potter
Punch.... W. A. Bernard
Rail clip.... O. M. Knox
Rail guard for electric roads. Third.... J. S. & J. S. Payne
Rail joint.... A. L. Thompson et al
Railway current collector. Electric.... R. Slater
Railway. Electric.... H. N. Sporborg
Railway or other vehicle coupling.... D. Roche
Railway rail.... J. Mander
Railway switch.... F. T. Troutman et al
Railway switch.... J. E. Swanson
Railway switch and signal mechanism.... C. M. Hurst
Railway switching apparatus.... J. P. Coleman
Railway tariff holder.... B. Briard et al
Railway third rail system. Electric.... W. H. Kilbourn
Railway tie. Metal.... W. Wheeler
Rain gage.... F. Thomas
Ratchet mechanism.... A. Spangenberg
Reel.... C. W. Stambaugh
Refrigerating appliances. Oil separator for rotary.... M. A. Audiffren
Refrigerator.... L. De Vaux
Registering mechanism.... E. H. Palmer
Registering monetary transactions. Apparatus for.... J. Frydman
Road construction. Raking tool for.... W. C. Wegner
Rolling machine. Metal.... P. Bondell
Rotary engine.... L. H. Cobb
Rotary engine.... J. Jahn, Jr
Rotary engine.... D. F. Smith
Rotary engine.... H. Chapman
Rotary engine.... J. Mohr
Rotary engine.... C. A. McCallister
Rotary engine.... C. W. Allen
Rotary engine.... H. H. Liemke
Rotary engine.... 2 pats.... C. Hendricks
Sap spout.... J. F. Warner
Sash holder.... J. L. River
Sash lock.... J. Noseworthy
Sash lock and striker.... R. B. Huguin
Saw.... T. A. Remsen
Sawmill set works.... T. S. Wilkin
Sawmill set works.... E. C. Monroe
Saw setting machine.... J. Hegstrum
Scale, balance and beam. Computing.... J. E. Duncan
Scale. Stenographer's.... G. Logan
Screw cutting die.... H. E. Adt
Seam ripper.... A. M. Minter
Seeding machine.... L. E. Waterman
Selecting apparatus and system. Automatic.... J. T. Fisk
Separator.... J. F. A. Brunn
Sewing machine guide.... R. L. Clarke
Shade roller attachment.... B. F. Bell
Sharpening. Agricultural disk.... C. Y. Davidson
Shoe rack.... L. P. Bowen
Shoe rack.... P. J. Callahan
Signaling. Automatic block.... W. A. Luby
Smelting and reducing metals.... C. Diesler
Smoke consuming apparatus for locomotive boilers.... F. S. & F. R. Pleasonton
Sod cutter.... G. Lane
Soldering machine. Bail ear.... E. J. Moore
Sonner frame.... G. A. Zundel
Speed changer.... A. L. De Leeuw
Spline weight.... F. K. Lord

Speed and distance measurer and indicator.... C. J. Springer
Spool.... G. H. Reynolds
Spooler guide.... H. Lawrence
Spooling machine thread guide.... J. R. Mitchell
Spring back chair.... J. Gilson
Steam boiler.... A. B. Duff
Steam generator.... M. E. P. Chaboche
Stereoscopic attachment.... O. S. Leeland
Stereotype block.... F. A. Berry
Stoker. Automatic.... P. J. Hamler
Stove.... J. L. F. Bauer, Jr
Stove or furnace.... H. O. Banks
Stump extractor.... C. R. Twitty
Stump puller.... E. M. Erdmann
Switch and foot guard.... R. H. Frizzell
Switch point protector.... J. L. Brewer
Tap.... H. E. Adt
Target apparatus.... J. L. McCullough
Telegraphy. Wireless.... 2 pats.... L. D. Wildman
Telephone.... J. W. Mead et al
Telephone exchange ringer system.... T. C. Drake
Telephone switchboard circuit changer.... W. E. McCormick
Telephone system. Party line.... T. C. Drake
Telephone transmitter.... D. C. Jackson
Telpherage system.... J. H. Johnson
Thermo electric apparatus.... W. H. Bristol
Thermo electric couple, 3 pats.... W. H. Bristol
Thermo electric element.... W. H. Bristol
Thread unwinder.... W. H. Gould
Tire and rim. Vehicle wheel.... J. F. Pease et al
Tire. Rubber.... E. S. Roberts
Tire valve. Pneumatic.... J. E. Keller, Jr
Tire. Vehicle.... C. Motz
Tire. Vehicle.... G. W. Whittemore
Tire. Vehicle.... W. P. Cronin
Tire. Vehicle.... N. Crane
Tires. Detachable flange for rubber.... C. W. Kelsey
Tobacco pipe.... A. Heald
Tobacco stripping machine.... J. G. Havens
Tool. Pneumatic.... C. C. Poole
Toy. Detonating.... C. E. Wenzel
Toy jack-o'-lantern.... G. E. Robinson
Train controlling system. Safety.... G. W. Cohen
Tramway point. Automatic.... R. H. Radford
Transformer.... W. S. Moody
Tray.... J. S. Duncan
Trolley.... J. Q. Brown
Trolley.... B. E. Sunny
Trolley conductor cut out.... P. G. Watmough, Jr
Trolley. Multiple.... J. S. Briggs
Trolley. Overhead.... C. C. Chambers
Trolley pole.... C. Jones
Trolley wire replacer.... J. D. Ratliff
Truck.... W. C. Bucklew
Truck brake. Mill.... C. L. Houghton
Truck brake rigging. Railway.... F. L. Clark
Trucks, &c. Antifriction mechanism for railway car bogie.... J. E. Cooper
Turbine.... O. Junggren
Turbine bucket construction.... H. Geisenhoner
Turbine bucket cover, 2 pats.... H. Geisenhoner
Turbine wheel. Steam.... E. A. Edwards
Type writing machine.... B. C. Stickney
Type writing machine.... J. W. Booth
Type writing machine line lock attachment.... W. A. Parker
Valve gear.... J. E. McNeely
Valve mechanism.... T. H. Alexander
Vapor burner air mixing pipe.... 2 pats.... J. Stubbers
Vehicle brake. Double.... A. Winton
Vehicle. Electrically propelled.... R. Thayer
Vehicle wheel.... T. Midgley
Velocipedes, &c. Spring support for.... A. Beulin
Vending apparatus.... D. K. Jackman
Vending machine.... F. J. Rowse
Vending machine.... J. B. Pfeifer
Ventilator.... J. C. Hennis
Wagon. Dump.... H. C. Tripp
Wagon. Dumping.... W. O. Shadbolt
Wagon rack. Adjustable.... E. D. Dickinson
Watch escapement.... H. A. Leonard
Water cooler.... W. H. Shook
Water motor.... M. H. White
Weighing apparatus.... U. S. James
Weighing machines or scales. Automatic testing and recording machine for.... U. S. James
Weighing mechanism. Refrigerator.... A. H. Hoag et al
Window cleaning chair.... H. Harrison
Window. Horizontally pivoted.... H. B. Hiteshaw
Window screen.... W. E. Ellis
Window stop.... W. F. Shaw
Wire stretcher.... C. Adkins
Wrappers. Preparing.... A. Shedlock
Wrappers to cakes of soap, &c. Machine for applying.... T. G. McGirr et al
Wrench.... W. F. Marks
Wrench.... W. Cronk

DESIGNS.

Badge.... H. Getz
Badge.... R. N. B. Kirkham
Box. Paper.... R. L. Myers
Braid.... V. G. Schuck
Forks, spoons, or similar articles. Handle for.... G. C. Edwards
Forks, spoons, or similar articles. Handle for.... S. Smith
Rug.... 2 pats.... A. W. Bosch
Spoons, forks, or similar articles. Handle for.... L. W. Banks
Tray. Bread.... A. Steffin

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MECHANICAL PATENTS.

Addressing machine.... W. Murphy
Addressing machine.... J. S. Duncan
Agitator. Rotary.... J. Smith
Air brake.... F. S. Sheffer
Air brakes. Device for automatically operating.... T. H. Hillman
Air compressor.... L. T. Pyott
Air or gas compressor.... J. Braunwalder
Air or gases. Receptacle for storing compressed.... M. Loewenstein et al
Air vent.... A. Roesch
Alcoholic liquors from empty casks or barrels. Removing.... P. P. Peace
Amusement apparatus.... T. W. Eck

Amusement device..... H. Pfeiffer
Ankle brace..... H. Lueck
Announcing machine..... G. A. Moore
Annunciator..... P. O'Connor
Asynchronous motor..... P. Jigouzo
Automobile..... C. W. Van Winkle
Automobile motors. Means for cooling internal combustion..... J. H. Jones et al
Awning..... C. A. & W. E. Metzger
Ax head with removable bit..... L. L. Gilks
Bait caster. Mechanical..... T. A. Kimberlin
Bale or package of fibrous material..... P. K. Dederick
Bales or packages of fibrous material. Forming..... P. K. Dederick
Baling press..... C. J. Ryan
Baling press..... 2 pats..... P. K. Dederick
Ball..... J. A. Manahan
Ball mill cylinder..... G. Descamps
Balls. Manufacture of golf..... E. Kempshall
Banister or railing..... W. London
Barrel dressing or boring machine..... F. Pfleger et al
Barrels, &c. Lining for..... J. Arkell
Bearing. Spindle ball..... W. Bauerle
Bed. Folding..... W. H. Fauber
Bed. Tent..... G. Langgous
Beer cooler tank..... R. S. Valentine
Beer heater condenser, and continuous doubler combined..... J. J. Corcoran
Belt. Waist..... T. Gallert
Belting and process of manufacture..... G. O. Thomas et al
Bicycle driving mechanism..... A. A. Kennedy
Bicycle or cycle holder..... J. F. Sargeant
Binder. Loose leaf..... L. A. Jones
Binder. Temporary..... J. H. Rand
Boiler..... G. Maffit et al
Boiler tube cutter..... 2 pats..... E. Shackelford
Boiler water gage. Steam..... J. S. Livengeod
Bolt reinforcer..... M. Hirsch
Book leaf. Detachable..... H. W. Ayres
Bookcase. Sectional..... P. W. Casler
Boring tool..... W. Lodge
Bottle holder..... G. A. Henckel
Bottle. Non refillable..... T. H. Steck
Bottle. Non refillable..... G. Tuman
Bottle. Non refillable..... G. G. Koss
Bottle. Non refillable..... P. J. Wilson
Box fastener..... W. S. Heddles
Brick kiln..... S. Rawles
Brush manufacturing machine..... J. F. Mumford
Buckle..... J. F. Atwood
Buckle. Suspender..... D. L. Smith
Building block..... L. M. Larowe
Button. Safety fastening..... J. Combs
Calipers. Compression indicator for..... C. C. McClaughry
Camera..... F. A. Brownell
Can closure and spout..... J. M. Edwards
Can opener..... H. W. Thurlow
Candy pulling machine..... E. W. Barratt
Cane..... F. A. Finch
Car brake..... J. B. McKiel
Car brake..... J. W. Lafferty
Car brake..... S. T. Noble
Car brake. Railway..... E. W. Olds
Car coupling..... W. Wright et al
Car coupling. Automatic..... A. B. Gardella
Car coupling emergency key. Automatic..... J. T. Keating
Car door. Sliding..... A. W. Sullivan et al
Car. Dump..... A. Ellis
Car fender..... W. H. Reece
Car fender. Street..... J. Derr
Car hand speed controller..... L. J. Robb et al
Car. Railway..... C. S. Sergeant et al
Car step or footboard..... A. Christensen
Car ventilator..... W. P. McCreary
Carburetor..... H. Seoder
Cards having beveled edges. Means for cutting flat sheets of cardboard, paper, &c., into..... H. F. Healey
Carousel. Aquatic..... G. A. Miller
Carpet renovating apparatus..... W. H. Loomis
Carriage storm shield..... E. S. Lynd
Cartridge belt..... W. C. Fisher
Cartridge belt..... F. A. Frissell
Cash register..... T. Carney
Casting spaces. Apparatus operated by a perforated band for..... M. Wehrin
Catamenial sack..... T. I. Griffith
Chaffing dish lamp shutter..... H. C. Wright
Chain. Drive..... L. Schildknecht
Chain hook. Watch..... J. A. Bartlett
Chair iron. Spring seat..... A. White
Churn..... J. Hirschenfeld
Cigars, &c. Machine for applying bands or labels to..... W. C. Briggs
Clamp..... A. Martens
Clamping device..... C. W. Coleman
Clasp..... M. & L. Rubin
Clinometer..... F. T. Cable
Clock. Electric..... H. Campiche
Clothes fastener..... D. N. Booth
Clutch. Friction..... H. S. Credlebaugh et al
Coffee or spice mill drawer spout..... G. E. Pearman
Coffin box..... C. D. Rowland et al
Color comparator or color screen. Translucent..... A. E. Outerbridge, Jr
Color. Red azo..... P. Julius et al
Color. Yellow red azo..... P. Julius et al
Column. Metal and concrete..... R. A. Cummings
Combing machine. Wool..... F. G. Berwick et al
Compress. Hydraulic..... S. J. Webb
Concrete mixer..... H. Campbell
Condenser. Surface..... L. R. Alberger
Conductor point operating mechanism. Overhead..... C. G. Goord
Conduit..... M. J. Stone
Continuous kiln..... D. F. Henry, Jr
Conveyer..... J. M. Dodge
Conveyer. Pivoted bucket..... J. M. Dodge
Cooker. Steam..... R. H. Gray
Copper sulfate. Making..... G. Gin
Copying press..... G. H. Taylor
Core compound..... G. A. Hubbard
Cotton chopper..... C. C. Brown
Cotton chopper and cultivator..... J. Walthall
Cotton cleaning machine..... E. J. Gardner
Counter..... E. G. Straude
Crate..... J. S. Horton
Cream separator..... H. M. Lourie
Cuff..... J. B. Boyle
Cuff holder..... J. B. Boyle
Curtain fixture..... C. L. Hopkins
Curtain fixture..... H. F. Vogel et al
Cuspidor..... G. E. Jarrett

Cutting device..... C. T. Knittel
Cycles, Grip operated controlling mechanism for motor..... C. O. Hedstrom
Dam. Concrete..... W. L. Church
Damper mechanism. Time..... G. R. Young
Dental matrix..... S. E. Knowles
Dental process..... M. A. Sparks
Derrick. Pole..... F. D. Byler et al
Desk..... F. C. Valentine
Display device. Card..... S. D. Black
Double speed engine..... O. L. Richards
Draft equalizer..... A. N. Lawrence
Drawers, boxes, &c. Partition for..... P. H. McGrath
Drawing rollers..... B. Birtwell
Dredges, &c. Apparatus for loading suction..... A. Van den Haspel
Drier..... D. Bourdeau
Drying kiln..... J. F. Hanrahan
Drying machine..... S. A. Cohen
Drive way gate..... S. M. Ash
Driving mechanism..... L. Abraham
Driving mechanism..... F. Miller
Dust trap and ventilator..... F. E. Davis
Dye and making same. Black sulfur R. Launch
Dye and making same. Direct cotton sulfur..... R. Lauch
Dye. Blue anthraquinone..... W. Berchemann
Dyeing apparatus..... O. Venter
Dyeing &c. Apparatus for..... J. Schmitt
Dyes stable. Making sulfur..... R. Lauch
Electric battery..... P. J. Kamperdyk
Electric cables. Joining sections of underground conduits for..... J. M. Graves
Electric motor starter and regulator combined..... E. T. Moore
Electric switch. Pressure controlled..... 2 pats..... W. J. Pugh
Electrical energy. Converting the energy of fuel into..... H. Jone
Electrical heater..... L. B. Pemberton
Electromagnet..... D. L. Lindquist
Electrotherapeutic instrument..... J. W. Shryock
Elevator belt automatic attachment J. B. Soule
Elevator bucket..... W. G. Avery
Elevator safety device..... A. Perri
End gate fastener..... W. C. McDonald
End gate. Vehicle..... A. Woerber
Engine electric igniter. Gas..... E. Ford
Engine speed regulator. Explosive..... J. C. Crocker
Envelope clasp..... J. A. & J. E. Sherman
Evaporating apparatus. Liquid M. Ekenberg
Exercising apparatus..... G. D. Shultz
Explosive engine..... G. F. Murphy
Eyelet setting machine, &c..... E. B. Stimpson
Fare register operating mechanism..... W. I. Ohmer
Faucet. Self closing..... J. C. Norris
Feed mechanism. Automatic..... G. F. Hutchins
Feeder. Automatically regulated steam boiler..... E. L. del Castillo
Feeding solutions to boilers. Device for..... H. Sweet
Felly. Wheel..... J. W. Bettendorf
Fencing tool..... J. F. Moore
Fertilizer distributor..... A. J. Graves
Fibrous matter. Nitrating..... J. Selwig
File. Document..... J. H. Van Horn
File or binder..... J. L. McMillan
Filing cabinet..... T. P. Dolan
Fire curtain..... H. D. Haid et al
Fire extinguisher..... W. R. Pierce
Fire extinguisher. Automatic..... H. W. Martin
Fire lighter. Automatic..... F. J. Pospisil
Fires. Preventing..... N. Sulzberger
Fireproof construction..... J. B. Hinchman
Fireproof skeleton flooring..... H. G. V. Rydahl
Fireproof window releasing device..... A. W. Cooper
Float..... F. & F. H. Engelhard
Floor furnace..... W. R. Kloebe
Floor. Parquetry..... 2 pats..... C. M. Krebs
Fluid fuel burner..... G. Moork
Folding table..... T. Coldwell
Fruit sorter..... J. B. Crum
Fuel. Artificial..... F. J. Bulask
Fuel feeding apparatus..... G. L. Swift
Furnace..... R. D. McManigal
Furnace casing..... T. J. March
Furnaces. System for the control of electric..... W. M. Johnson
Gage..... C. W. Chafee
Gage band..... F. C. Randall
Galvanic battery..... 2 pats C. B. Schoenmehl
Garment holder..... T. J. Murphy
Gas from petroleum oil, &c. Apparatus for producing combustible..... C. A. Kuenzel
Gas generator. Acetylene. J. H. Eichler et al
Gas generator pressure regulator Acetylene..... E. F. Deters
Gate..... A. Y. Fry
Gear. Changeable speed..... R. C. Killam
Gear. Transmission..... O. O. Turru
Gear. Two step..... S. M. Wixcel
Gearing..... H. P. Maxim
Gearing. Variable speed transmission..... H. L. F. Trebert
Girder. Metal and concrete. R. A. Cummings
Glass finishing apparatus..... F. Woodruff
Glass. Metallized..... A. Diat dit Diaz
Governor. Steam engine..... J. Eberhardt et al
Grading or separating system. Pneumatic..... W. S. Osborne
Grain feed governor..... J. E. Bousser
Gridiron..... J. F. Shiffert
Grinding or polishing machine..... M. Setter
Gripping device..... P. E. & P. B. Shee
Hammer. Power..... C. Leonhardt
Handle..... E. Burns
Harrow..... C. Lindquist
Harvester. Beet..... I. C. Lesh
Hat paring machine..... C. I. Sterling
Head rest..... A. B. Cihak
Heat by burning liquid fuel. Apparatus for production of..... G. Gordejeff
Heater..... A. G. Kaufman
Heater for attachment to oil or gas burners..... W. L. Hallett
Heating or cooking utensil..... R. Grove
Heating system. Hot water..... C. C. Longard
Heel compressing machine mold or die..... B. F. Mayo
Heel compressing machine mold or die..... C. L. Whiting
Hinge..... C. S. Van Wagoner
Hinge pintle retainer..... G. A. Stark
Hinge. Sheet metal..... C. S. Van Wagoner
Hoisting bucket..... G. P. Wern
Holder. Safety..... M. A. Davis

Holding securely articles of unequal length and thickness. Appliance for..... A. J. Dawson et al
Horseshoe..... W. H. Lake
Horseshoe. Composition..... H. Bartley
Horseshoeing apparatus..... J. Alexander
Hose coupling..... L. B. Colin
Hose coupling..... F. Sticker
Hothouse ventilator..... E. A. Tonsley
Hot water and steam heating engine..... W. Heckert
Hub. Vehicle..... O. E. Johnston
Hydrant..... R. L. Pollock
Hydraulic motor..... W. P. Powers
Hydrocarbon burner..... R. Matheson
Hydrocarbon burner for boilers or other purposes..... I. Carl
Ice hook..... R. Hughes
Insulator. Electrical..... C. W. Jefferson
Ironing board..... T. J. Blagg
Jacquard mechanism wire lift needle W. Wattie
Jar cap..... E. J. Smith
Jewelry protector..... A. Landau
Kite parachute device..... E. Moravek
Kneading and mixing machine E. F. W. Wieda

Continued in September number.

Canadian Patents

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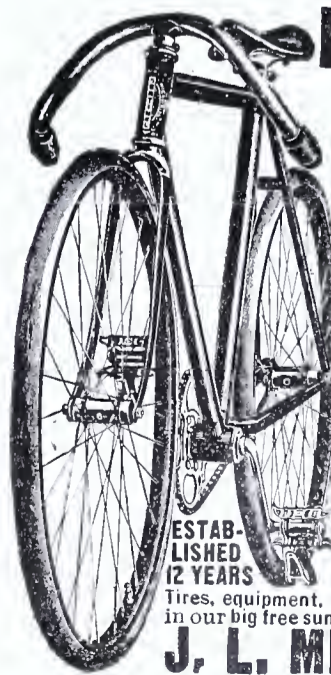
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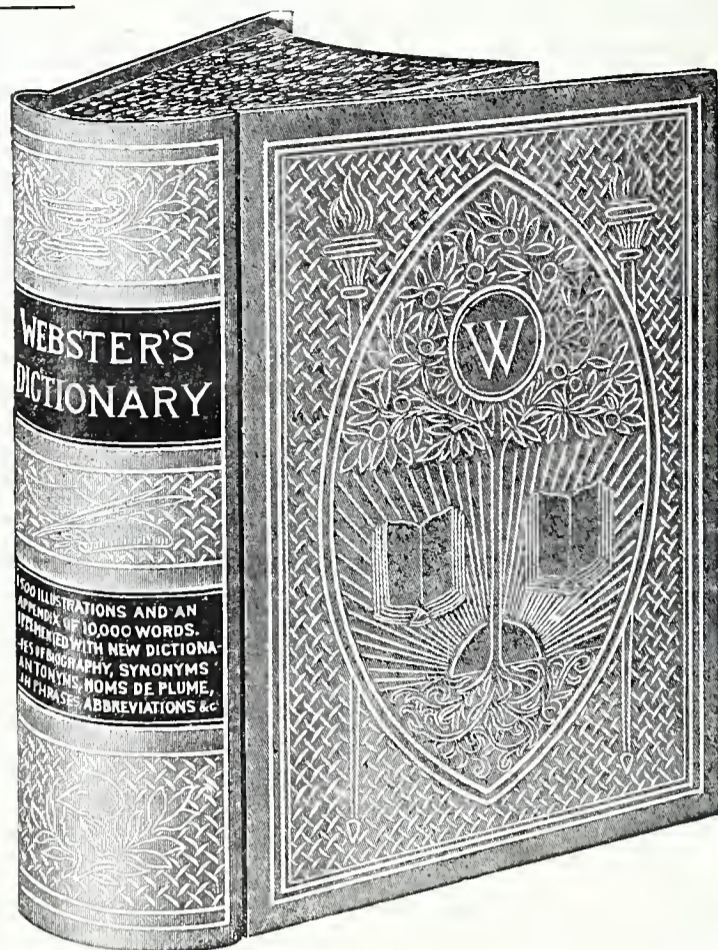
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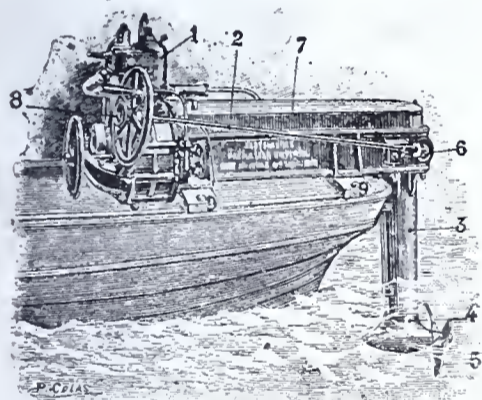


A REVOLUTION IN NAVIGATION.



THE UNIVERSAL TRANSFERABLE STEERING PROPELLER.

THIS invention is attracting considerable attention in Europe where it is being introduced with much success, and a glance at the accompanying illustrations will readily explain the reason for this. It embodies some new ideas in the steering and propelling of small craft, and a consideration of the invention in detail will be profitable.



The apparatus consists of four parts—the motor (1),—the horizontal frame (2),—the vertical arm (3),—and the screw-box and screw (4, 5) movable around a vertical axis.

The motor works with a special carburetor with absorbing diaphragm. This motor acts directly on a shaft passing through the horizontal frame (2), which in turn, by a system of gearing, transmits the power to a vertical shaft passing through the vertical arm (3) and communicating to the screw the rotary motion necessary for the propulsion of the boat.

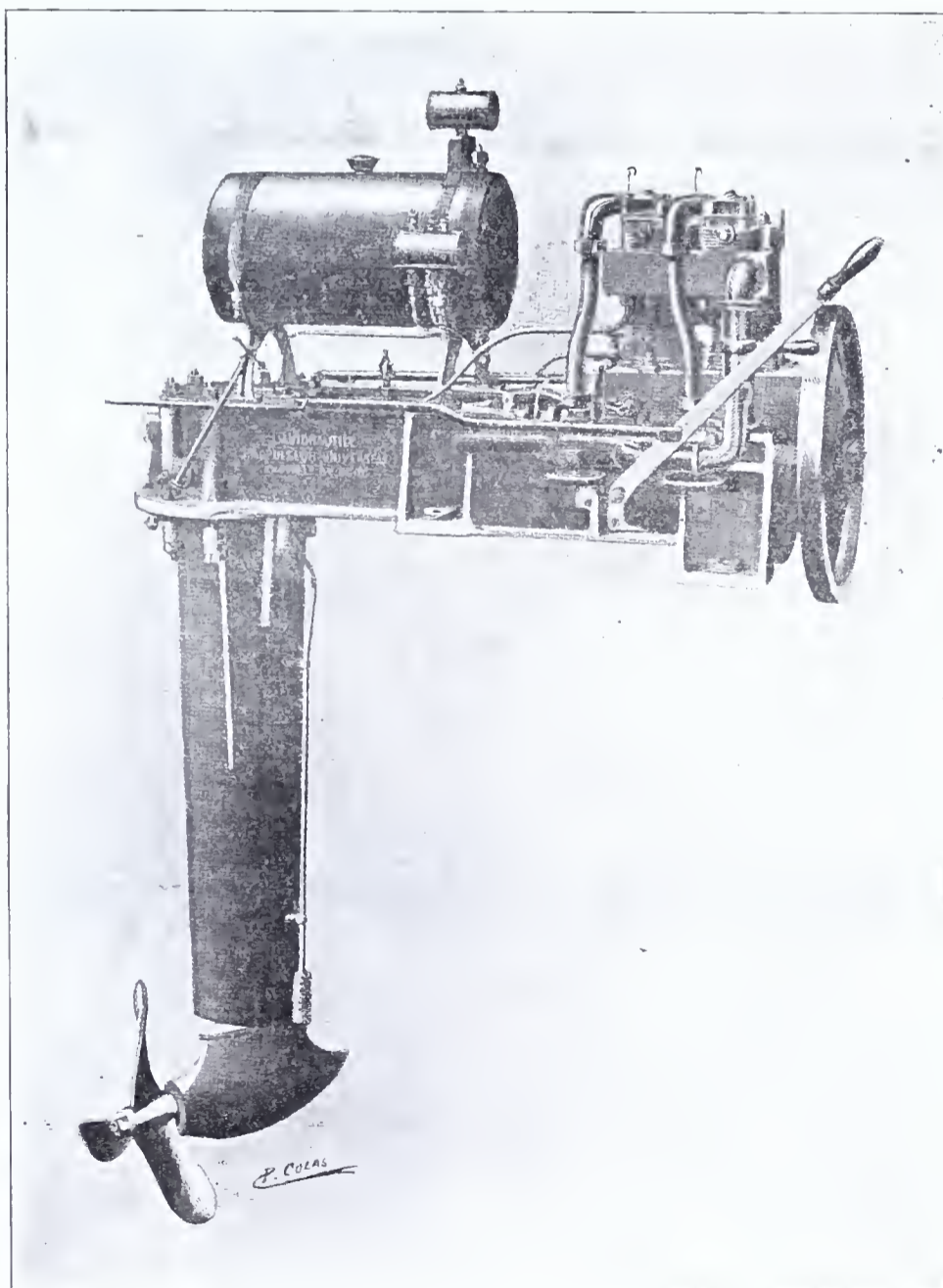
Independently of the rotary motion, the screw is capable of a gyratory movement, which permits it to be used to give *direction* to the boat, with more facility and better results than the ordinary rudder. To obtain this motion, the screw is attached to the screw-box (4), which is kept in position at the lower extremity of the vertical arm (3) by a movable tube passing through the arm, the upper portion of the tube ending in a pinion (6) controlled by a shaft (7) passing outside of the horizontal frame (2), to which the steering-wheel (8) is attached. By operating the steering-wheel, the screw

can be turned horizontally through 360° without interrupting its movement of rotation, or changing the speed of the motor.

To go astern, it is only necessary, by means of the steering-wheel, to make

to turn in its own length.

A stop is adjusted to the steering-wheel, by which the latter can be clamped, and the boat will run on its own course alone without the aid of the helmsman.



a half revolution of the screw-box, without reversing the motor.

If the screw-box is placed perpendicularly to the direction in which the boat is moving, the latter can be made

If the steering-wheel is left free, the action of the water on the blades of the screw will cause the screw-box to turn in its circle, and the boat will come to a standstill.

The gyratory movement of the screw-box through the entire arc of a circle is essentially the most interesting feature of the new system.

The screws are three-bladed, and make from 1,000 to 1,100 revolutions per minute.

Being placed in the center of the boat, it leaves the remainder of the latter perfectly free.

The apparatus is started as readily and as easily as an automobile, but its action is far steadier, owing to its running on a fluid element—water: whereas, the automobile runs on uneven, and consequently, resistant roads.

The steering propeller allows the boat to perform the most astounding rapid evolutions, such as had never before been equalled, because the full *propulsive power* of the screw is applied to this propulsion and to the steering of the boat.

It enables a boat, however placed, to instantly alter its course ahead or astern, and to starboard or port, without reversing or stopping the motor, and permits the boat to turn completely within its own length.

It is important to note that:

1. The "Transferable Steering Propeller" being independent of the hull of the boat, does not transmit to the hull the vibrations of the motor, and consequently can not produce any trepidation to the ribs of the boat. Thus, the staunchness and preservation of the boat are assured.

2. The apparatus occupies but a mere modicum of space, so that the *whole of the boat* is available for passengers or cargo.

3. Its light weight, which it is impossible to attain in the case of ordinary engines fixed to the hull and bottom of a boat, makes it possible to obtain a *greater and more continuous speed* on an equal consumption of power and fuel.

4. The possibility of constantly having both the motor and its direction (by means of the steering-wheel,) under one's eyes and hands, is very seldom obtained in fixed motor boats,

or motors of engines fixed to the hull.

5. It requires no special engineer, as in the case of an engine fixed to a boat's hull, which, if disabled, leaves the mechanism at the mercy of the weather, and, besides, needs the constant attention of its engineer.

The motor may be driven equally well with uncarbureted alcohol at 95°, as with naphtha or petroleum lighting oil, and the apparatus is always delivered at the destination quite ready to be immediately set working on a boat.

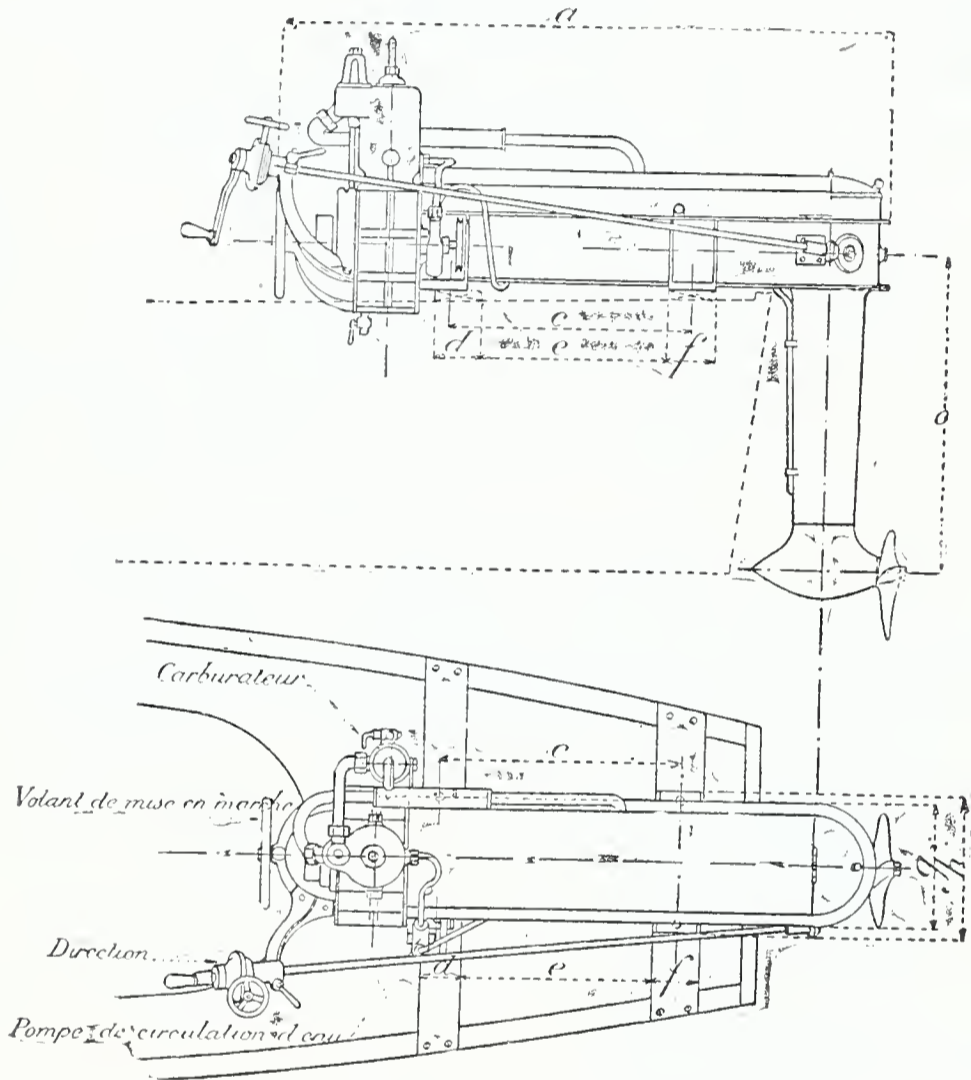
The commercial possibilities of the invention are almost limitless.

The "Transferable Steering Propeller" fitted to barges, flats, lighters, coal-hulks, rafts, and cargo-boats, can render them automobile, and thus

stantly becomes an automobile vessel.

A ship's life-boat usually requires 12 hands to man it, and these men and their ten oars take up at least one-third of the boat's available space. The same boat, fitted with a "Universal Transferable Steering Propeller," only requires two hands, one at its prow for life-saving, the other in the stern sheets to steer the boat. Thus the full capacity is available. Besides, the propulsion being purely mechanical, is much more efficient and regular, and the boat's head can always be kept to the sea, owing to its equal facility of steering backwards or forwards.

In the event of one vessel desiring to communicate with another vessel in distress, during heavy weather on the



independent of costly manual or animal haulage. It would impart to such a craft much greater speed and accuracy of direction, thus increasing to an enormous extent its carrying and earning powers. Besides, a leading boat or barge, fitted with one of the steering propellers, can take others in tow, thus rendering the barge-owner independent of tugs.

A pleasure party on a yacht or sailing boat is liable at any time to become becalmed: and, if this happens far out from shore, the boat is able neither to return to the harbor nor to continue its course. The same yacht or boat, possessing a "Transferable Propeller," may stow it in the hold during windy weather: but, as soon as the wind falls, or becomes ahead, the traveler, anxious to land quickly, simply has to make use of the "Transferable Steering Propeller," to be able to immediately and rapidly propel the yacht back to the landing-place. In short, a sailing boat possessing one of these "Steering Propellers" in-

high seas with a rowing-boat, lives and hands are risked: whereas, in the event of the same being fitted with a "Transferable Steering Propeller," only two hands' lives are exposed, and, in the latter case, the risk is but a very small one.

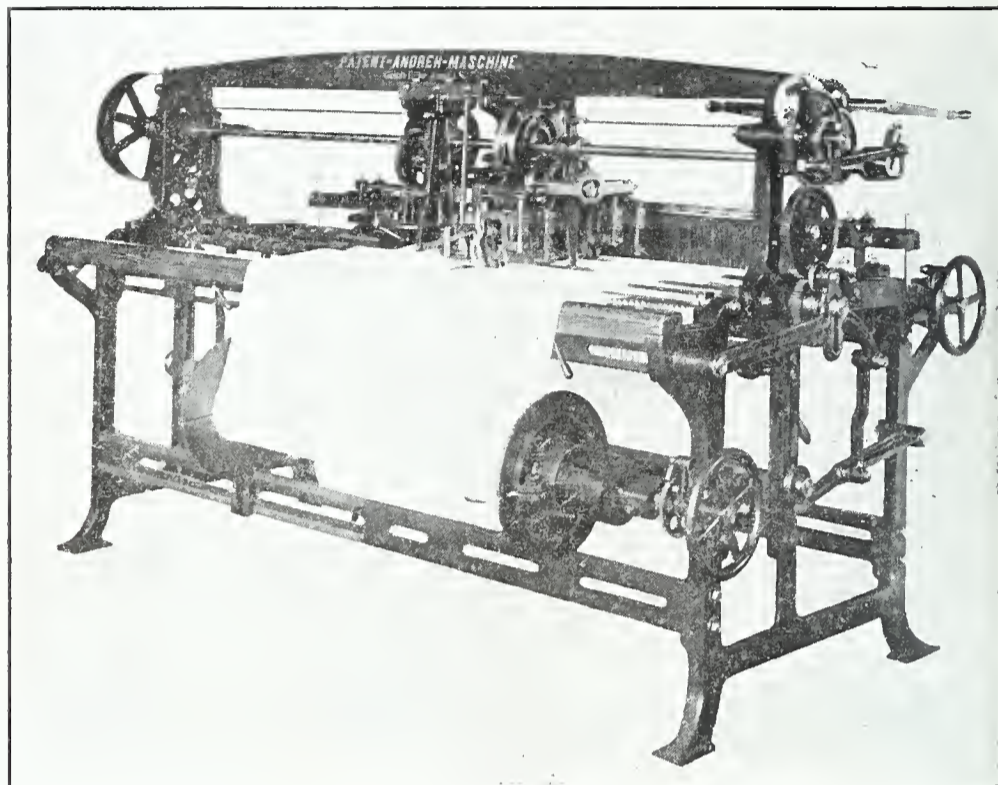
A boat fitted with a "Transferable Steering Propeller" is far better under control, seeing that it can be steered immediately in any direction by a simple movement of the steering-wheel, which instantly gives to the screw the required angle of direction; and this without it being at all possible (as heretofore,) that the boat should have any way on the screw.

An ordinary sailing fishing-boat can, if provided with a "Transferable Steering Propeller," emulate a steam-trawler, and can work more cheaply than the latter whenever the wind is favorable. In bad weather the "Transferable Steering Propeller" would simply prove invaluable to a fishing-smack, by allowing the boat to return both safely and promptly to harbor, so that the fish may be always landed fresh.

The invention has been adopted by the French, Russians, Japanese, Brazilians, Norwegians and Portuguese for use in their navies.

WARP TWISTING MACHINE.

Manufacturers of textiles will be interested in an invention that has just been perfected in Germany, the great centre of the weaving industry. It consists of a machine that fastens the ends of two warps by twisting the single threads together, and its object is to obviate the present method of twisting by hand, which is necessary in order to fasten the ends of the warp in the loom to those of the new warp, without taking the former out of the shafts.



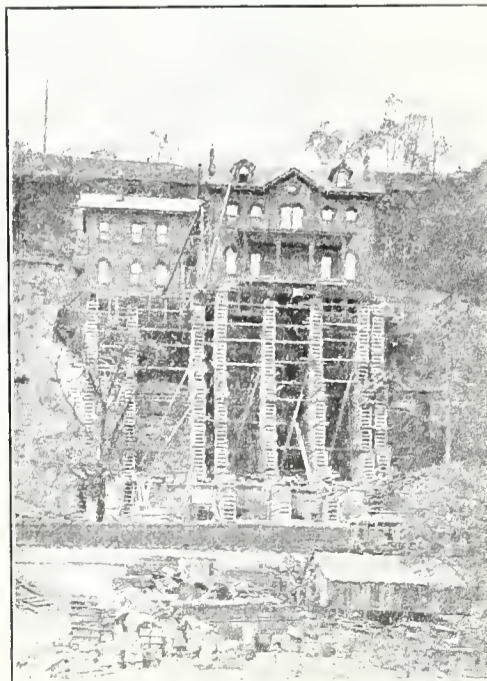
The invention has been evolved by a manufacturer of Zittau, Mr. Gustav Hiller, after six years of patient study and labor. According to our Consul in that city, experts conversant with this branch of manufacture say that there is at present no machine in use that serves the purpose that this one is designed to effect, or at least none that has proved entirely practical. The history of the many patents on machines intended to perform this operation has been a history of failures.

The accompanying illustration shows the warp twisting machine during the operation. Both warps are put into the apparatus with cross rods, in such a way that they are directly opposite each other, and the ends are held together by a press, which is lifted by the machine, in order to slacken the warp, at the moment that the two threads which are about to be fastened together are taken into the twisting apparatus. The machine works automatically; takes a single thread from each warp, cuts them, and twists them firmly together.

The machine is applicable to all classes of yarn—cotton, wool, linen or silk. It can twist about 2500 ends in an hour, while a good hour's work for an expert twister is 800 to 1000. Considering that it does the work of three experienced men and can be operated by an unskilled workman, the advantages of its use are obvious. It will no doubt soon supersede the old method, especially where plain and dobby looms are largely used.

RAISING A FULL HOUSE.

The accompanying cut shows a brick house, weighing over 1,000 tons, raised



100 feet and moved to a new foundation without a mishap. The scene of

this remarkable achievement was near Pittsburg, and the reason why it was necessary to raise the house to such a height was the presence of a steep cliff, beyond which it was desired to place the house. It was not only lifted to the brow of the cliff, but moved 500 feet back from its summit to its new foundation. The undertaking was rendered all the more difficult by the fact that the house was fifty years old, and was fitted with projecting wings, porches, etc.

In carrying out the work, eight large timbers, forty-five feet long, were placed under the house, together with two iron eye-beams of the same length, running from back to front. In the opposite direction were placed three timbers 84 feet long and two others 45 feet long. With the aid of 180 jacks placed under these timbers, the house was slowly raised, half an inch at a time. Under the supporting timbers and beams were placed ten piles of pine blocks, six inches square, and when the maximum height to which the jacks could raise the mansion had been reached, blocks were substituted for the jacks, the jacks were readjusted, and the work continued until the house was 150 feet in the air.

NEW TURBINE STEAMER.

PERHAPS the oldest ferry in the world is the cross-channel service from Calais to Dover. It has been in existence for more than twenty centuries, and the vessels which have been engaged in it include every variety of shipping, from Cæsar's high-peaked galleys, propelled by banks of oars, to the new turbine steamer *The Queen*, which has been in service since June 27, 1903.

During the first century there is no doubt that a cross-channel service of a more or less regular character was established as part of the system of posts maintained throughout the Roman Empire, and was used by the Roman generals commanding in Britain to keep up communication with Gaul and Rome. The lead thus given by the military authorities of Rome was followed by the missionaries, whose constant journeying kept open what may be fairly described as the progenitor of the present vast passenger and mail service, which, by way of Dover and Calais in 1901, num-

bered nearly 300,000 persons, and 4,500 tons of mail matter, the latter carried in 160,000 mail sacks.

power. From amidships forward on the promenade decks there is no noise or vibration whatever, and when the vessel is making 23 knots per hour in good weather, passengers are reminded of being on shipboard only by noting that they are gliding rapidly over the sea. Anyone embarking upon *The Queen* without knowing the ship or ever having heard of her will be conscious of the fact, as soon as she is under way, that he is on a steamship unlike any upon which he has ever

center turbine being high pressure and the two side ones being low pressure. When going ahead in ordinary work the steam is admitted to the high-pressure turbine, and after expansion there, passes to the low-pressure turbines and then to the condensers, the total ratio of expansion being about one hundred and twenty-five fold, as compared with eight to sixteen fold in triple-expansion reciprocating engines. At the ordinary steaming speed of *The Queen*, the revolutions of the center shaft are about 700, and of the two side shafts about 500, per minute. This high rotative velocity implies the adoption of propellers of small diameter, and the utmost care

and its connection with the low-pressure turbine being closed by non-return valves. The centrifugal circulating pumps and the air pumps, all of which are in duplicate—one set for each of the two condensers—are driven by independent double-cylinder steam engines, and the feed water is supplied to the boilers by two feed pumps, controlled by a float tank into which the air pumps discharge the condensed water. There are also special pumps for wash deck and fire service, as also the various pumps for oil and water circulation, as required by Parson's system. Steam is supplied to the turbines by two double and two single ended boilers. Scotch cylindrical type.

The Parsons turbine consists of a cylindrical case with numerous rings of inwardly projecting blades. Within this cylinder, which is of variable internal diameter, is a shaft or spindle, and on this spindle are mounted blades projecting outwardly, by means of which the shaft is rotated. The former are called fixed or guide blades and the latter revolving or moving blades. The diameter of the spindle is less than the internal diameter of the cylinder, and thus an annular space is left between the two. This space is occupied by the blades, and it is through these the steam flows. The steam enters the cylinder by means of an annular port at the forward end: it meets a ring of fixed guide blades, which deflects it so that it strikes the adjoining ring of moving blades at such an angle that it exerts on them a rotary impulse. When the steam leaves these blades it has naturally been deflected. The second ring of fixed blades is therefore interposed, and these direct the steam on to the second ring of rotating blades. The same thing occurs with succeeding rings of guide and moving blades until the steam escapes at the exhaust passage. FIG. 1 shows the arrangement of blades.

FIG. 2 is a cross section showing the arrangement of turbine machinery as adopted in the turbine channel steamer *The Queen*, and which is applicable to most vessels fitted with the turbine system of propulsion. There are three turbines, viz. one high-pressure in the center of the ship and two low pressure, one on each side of the ship. Each turbine drives a separate shaft, with one propeller on each shaft—three in all. Inside the exhaust casing of the low-pressure cylinders a reversing turbine is fitted. In ordinary going ahead the steam from the boilers is admitted through a suitable regulating valve to the high-pressure turbine, and after expanding about fivefold, it then passes to each of the low-pressure turbines in parallel, and is again expanded in them about twenty-five fold and then passes to the condensers, the total expansion ratio being about one hundred and twenty-five fold.

When coming alongside a jetty or maneuvering in or out of harbor, the outer shafts only are used, and the steam is admitted by suitable valves directly into the low-pressure turbines, or alternately in the reversing turbines as may be desired. With this arrangement, the port or starboard engines are capable of being worked ahead or astern independently of each other, and of the high-pressure turbine, the high-pressure turbine rotating idly in a vacuum while the vessel is maneuvering.

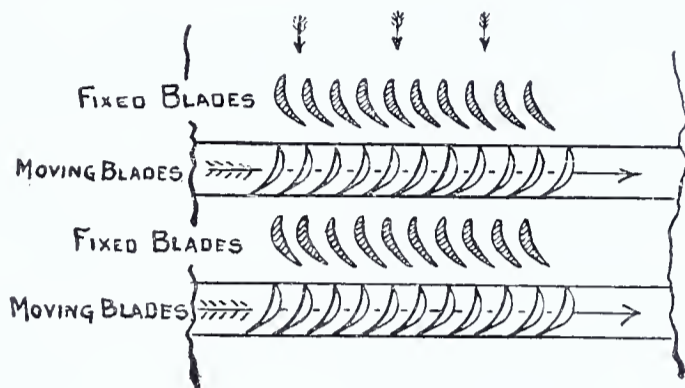


FIG. 1.—BLADES.

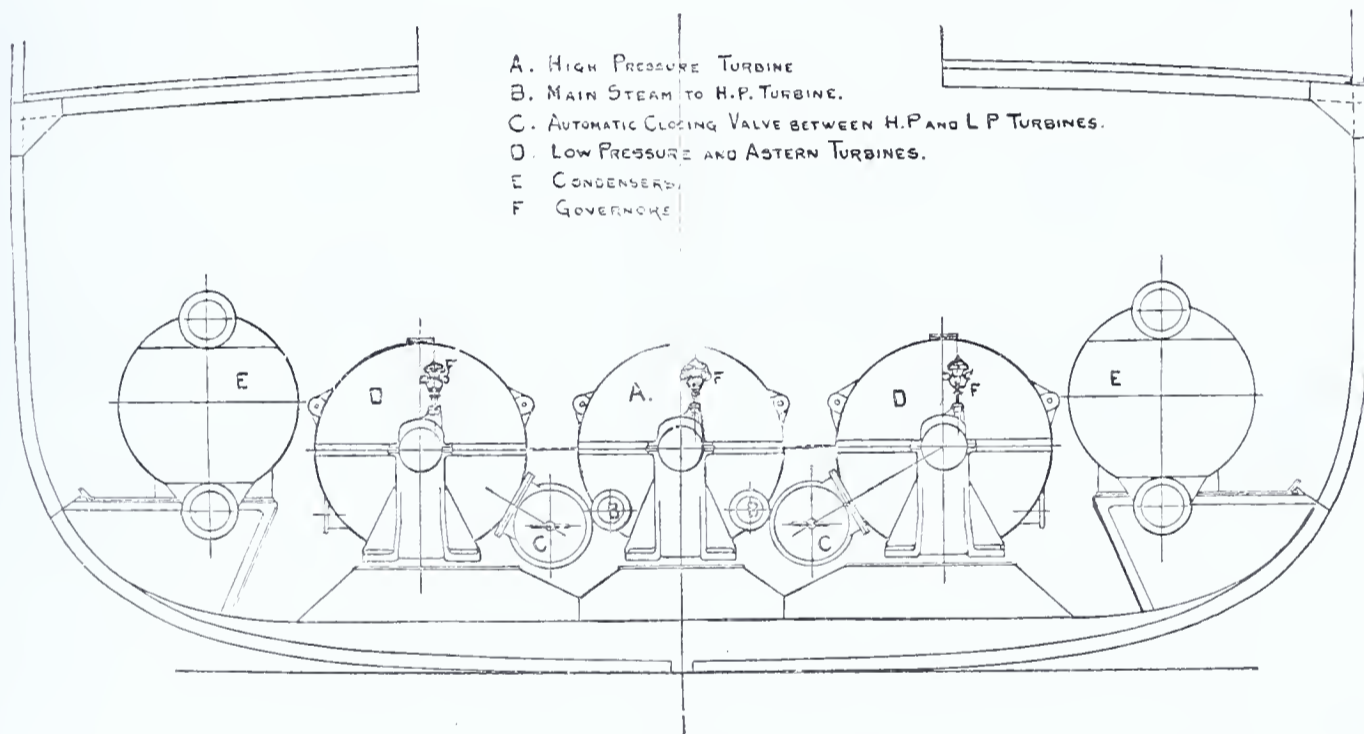


FIG. 2.—CROSS SECTION OF NEW TURBINE STEAMER, SHOWING END VIEW OF TURBINES.

bered nearly 300,000 persons, and 4,500 tons of mail matter, the latter carried in 160,000 mail sacks.

The first steamship to sail between Dover and Calais began her voyage in 1820. She was a Scotch-built vessel of 100 tons and named *Rob Roy*. She did not materially reduce the time of crossing, the time then required by sailing ships being two and a half to three hours. It was not till about 1880 that large steamers reduced the time of crossing to about one and a half hours, and it has taken the whole subsequent period to lessen the passage by another half hour.

In *The Queen* the turbine engines are placed well astern and take up but little space as compared with the ordinary engine. The noise made by these turbine engines is unlike the common engine. They make a rumbling noise like rapid-running dynamos. Even in their immediate vicinity there is little or no vibration, but one is conscious of being in close proximity to great

sailed. In heavy weather, however, the experience must be that of other twin-screw boats.

After a month's trial *The Queen* has made the voyage from pier head to pier head in fifty minutes.

The new vessel is 310 feet long, with a molded breadth of 40 feet and a depth of 25 feet, and has a complete awning deck.

The machinery consists of Parsons turbines, three being fitted having three lines of shafting. In maneuvering, the center shaft runs free; the two side shafts then take the place of ordinary twin screws, and, as has been demonstrated in the *Queen Alexandra*, the maneuvering power is in every respect as good as in ordinary twin screws, while in the going astern there is none of that objectionable vibration which is to be felt in the most modern twin-screw balanced arrangement.

The main engines in *The Queen* consist of three separate turbines, each driving its own line of shafting, the

is exercised in balancing them so as to obtain the full advantage of the absence of vibration obtained by the adoption of the turbine principle.

When going full speed ahead, all the lines of shafting, central as well as side, are in action: but when coming alongside a quay or maneuvering in or out of harbor, the outer shafts only are used, thus giving the vessel all the turning and maneuvering efficiency of a twin-screw steamer. The means for obtaining this maneuvering power demands a word or two of explanation. Inside the exhaust end of each low-pressure turbine cylinder is placed an astern turbine, controlled by slide valves operated by combined steam and hydraulic reversing engines. These valves admit steam directly into the low-pressure turbines, or into the reversing turbines within same, for going ahead or astern. The center turbine under these circumstances revolves idly in a vacuum, its steam-admission valve being closed

CLEVER NEW PATENTS.

A LIFE SAVING APPLIANCE.—ROTARY ENGINE.—COMBINED HAY AND STOCK RACK.

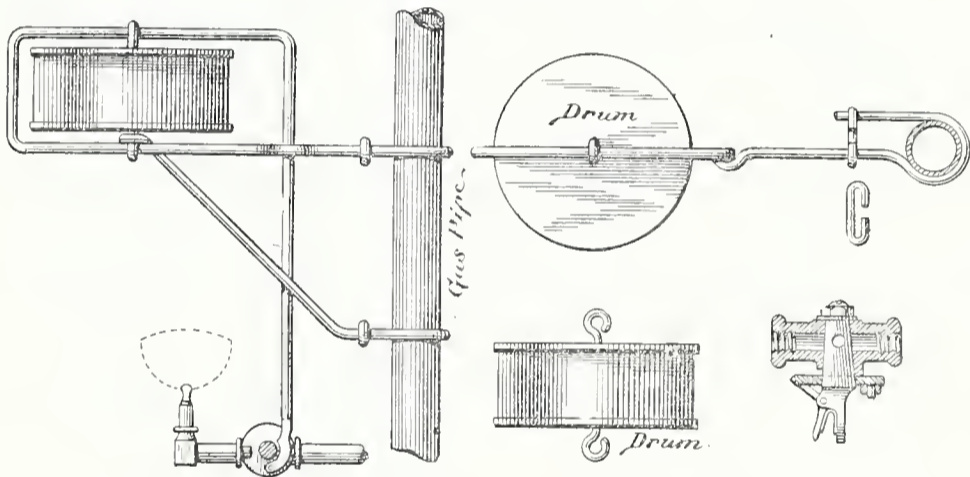
A Life Saving Appliance.

The daily papers in every section of this country frequently record the deaths of people who have been asphyxiated, either through their own ignorance or carelessness, or the criminal carelessness of others. Inventors have been alive to the situation and have endeavored to remedy it. Various plans have been made to prevent the recurrence of such tragic events.

Samuel Haigh, of Vancouver, B. C., Canada, has originated an attachment for gas burners, which, it is believed, will overcome the present menacing conditions, and the accompanying illustration shows the invention applied and disassembled. The object of his invention is to provide a gas-burner stop-cock that will be self-closing when, from any cause, the gas-flame has been extinguished.

It is commonly necessary, for the proper regulation of hotels or other similar institutions, to cut off the gas supply to the bed-rooms at a certain hour of the night, turning it on again in the morning. Where this is practiced, there is always a risk that the gas-cock of some room of the house has not been turned shut, either where the occupant has been temporarily absent, or has fallen asleep and left his gas burning. The result is that when the gas is turned on again, it escapes from the open burner, and an explosion may result when approached with a naked light, or the sleeping occupant may be asphyxiated.

Numerous attempts have been made hitherto to provide a self-closing stop-cock to obviate the accidents referred to: but all of the inventions have had serious defects, either of being too complicated in their mechanism for practical usefulness, or too cumbersome so as to form an obstruction to the light. The principle used in Mr. Haigh's invention to cut off the gas-supply is the contraction, when the flame is extinguished, of a volume of air expanded by the heat of the gas-flame; and the improvement lies in the mechanical means by which the movement produced by such contraction is applied to effect the shutting off of the gas from each particular burner, while permitting the stop-cock to be operated by hand in the usual manner.



The accompanying illustration shows the device applied to a gas-burner, and separated therefrom; also a detail sectional view of the particular form of stop-cock used in connection with the burner. Adjustably mounted on the vertical gas pipe is a light wire bracket, which supports at a suitable distance above the burner, a cylindrical air-tight drum, having thin flexible heads. From the drum extends a rod which connects with the plug of the gas stop-cock. It is obvious that while the gas is burning, the expansion of the air within the drum will distend the heads and operate the rod to keep the stop-cock open; but as soon as the flame is extinguished from any cause, the heads of the drum will collapse, and the connected mechanism will automatically resume its normal position, causing the gas stop-cock to close.

The detail view of the stop-cock, shows a lock pin attached thereto, whereby, on releasing the lock pin, the gas cock can be turned by hand, independently of the automatic mechanism. This enables the gas to be turned on and lighted without disturbing the cut-off mechanism. By this means, the automatic gas cut-off does not interfere with the ordinary operation of the gas stop-cock.

The invention is quite simple, and can be fitted to any gas burner, and when so applied, will absolutely prevent the gas from flowing after it is extinguished, for the supply is immediately cut off when the flame dies out. Being automatic, it works without and despite the intervention of man, and no matter how careless the occupant of the room may be, nor how ignorant concerning the operation of gas burners, the appliance of Mr. Haigh will work notwithstanding his ignorance and carelessness, and operate to cause the flow of gas to cease as soon as the flame is extinguished.

Rotary Engine.

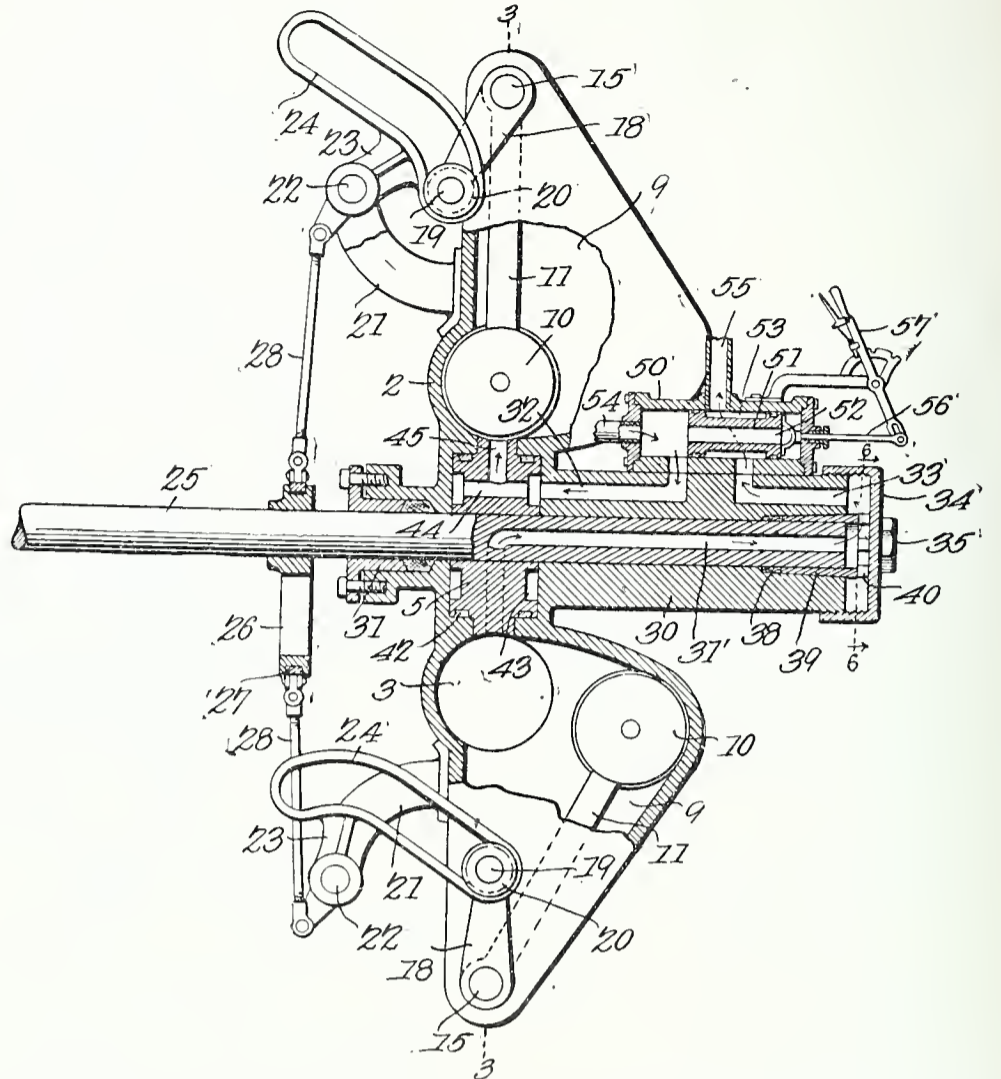
The fact that continuous rotary motion is much more efficient than reciprocatory motion, wherein the elements stop, directs attention to the undoubted advantages which rotary engines must have over those of the reciprocatory type, and the effort is now being made to bring rotary engines to a state of utility. One of the latest ideas in this art is the invention of Mr. George W. Montgomery, of Bellaire, Ohio, who has assigned a one-half interest in his patent to Mr. Arthur Morgan, of the same place.

The invention relates to certain improvements in that class of rotary engines in which one or more swinging abutments are moved into and out of an annular steam-cylinder.

The principal object of the invention is to provide a novel form of abutment-actuating means, while the abutment or abutments receive a practically intermittent movement and are allowed to remain within the steam-space for a sufficient length of time to accomplish the desired result.

A further object of the invention is to provide a novel form of steam-engine in which provision is made for governing the live and exhausted steam through

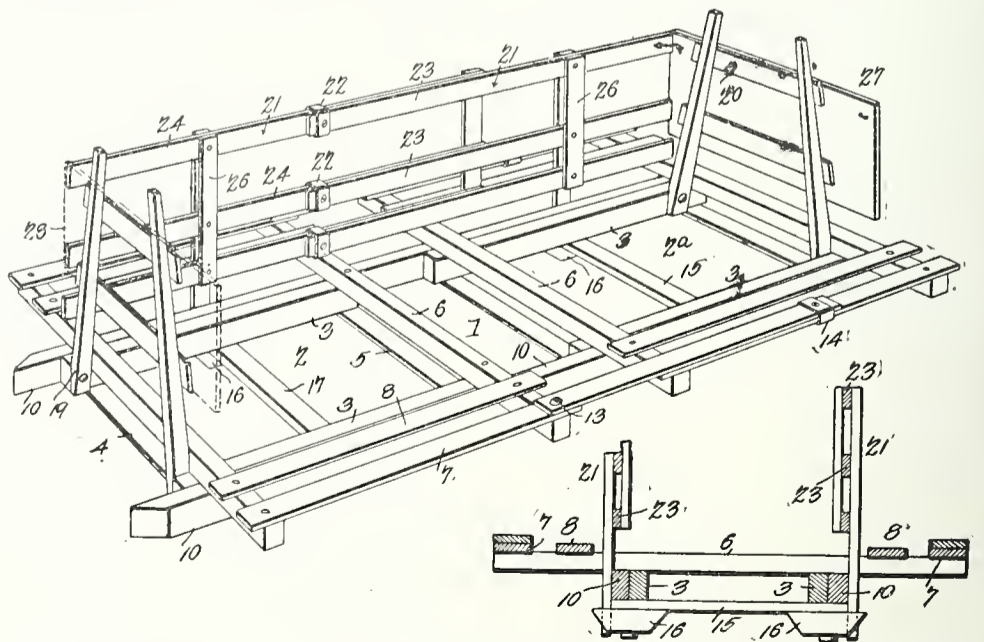
ported members, of which some are stationary and the others revoluble, and to provide for the proper balancing of pressure on opposite sides of the revoluble piston in order to prevent lateral pressure.



A stationary cylinder is employed having an annular steam space, and a shaft, extending through the cylinder, is provided with a wing that is located in the steam space. A pair of abutments are movable into and out of the steam space and are carried by rock shafts having their opposite ends extending outside the casing. Rocker arms are pivoted adjacent to the ends of each rock shaft and have cam slots. Crank arms secured to the rock shafts are provided with anti-friction rollers engaging in the cam slots. These rocker arms are operated by a cam mounted on the engine shaft. The cylinder, furthermore, has a centrally disposed sleeve, through which the engine shaft extends, and the sleeve has steam ports. A steam passage is formed in the shaft. A suitable valve controls the flow of steam through the ports, and a cap nut arranged at the end of the sleeve forms a steam-space for placing the shaft passage into communication with one of the sleeve passages. This affords simple means for controlling the steam supply to the engine.

Combined Hay and Stock Rack.

Benjamin Tanner, of Sturgis, Michigan, has devised a novel hay and stock rack, the object being to produce a device of this character which may be readily adjusted longitudinally to lengthen or shorten the same, as circumstances may require, and which may be adjusted for application to the running gear of vehicles varying in width. At the same time, the structure is comparatively simple of construction and inexpensive to manufacture. The device consists of a body portion composed of a fixed section having vertical standards, and a movable section also carrying vertical standards. Side



members are provided, each comprising two sections, one of which is sustained by the standards of the fixed body section, while the other is sustained by the standards of the movable body section. Means are employed for slidably connecting the sections of the side members and for slidably connecting the sections of the body portion. Braces for the side members are arranged outside of the same, and constitute a foot board for use in inspecting stock placed in the rack.

NOVEL DEVICES AT THE ST. LOUIS EXPOSITION.

One always goes to an exposition in the hope of finding some new thing, and the visitor to St. Louis is not likely to be disappointed in this respect, at least. The Palaces of Electricity, of Machinery and of Varied Industries contain, besides miles of exhibits that have lost their wonder for the crowd, only because they have become more or less familiar, other apparatus that is startling in the novelty. One of the most interesting is the mechanical telegraph sender, which transmits messages forty times as fast as a human being. The most rapid operator can send only about 50 words a minute over the wire; an ordinary operator has but one-third this speed. In the new device, an operator manipulating a Morse key reduces a message to perforations on a tape. This tape is then run between a pair of metallic springs, and arrives as Morse characters on a paper strip soaked with a compound which changes color under each electric pulse. Between cities 1000 miles apart, like Chicago and New York, this system transmits 1000 words a minute. Between New York and Philadelphia, or over a distance of 100 miles, a speed of 2500 words a minute can be attained. The inventor, P. B. Delaney, of New Jersey, suggests that this form of telegraphy be allied with the postoffice, so that a telegram of 50 to 100 words sent from St. Louis to New York could be delivered within an hour or two, and at a rate so low as to place telegraphy for the first time at the service of the people.

But we are learning to dispense with wires altogether, in the transmission of telegrams. Several forms of wireless telegraphy are exhibited, and all seem to work easily and successfully. Automatic telephones represent another important step in electrical communication. The use of the telephone in this country is spreading rapidly. Since the Buffalo Fair, the mileage of the telephones in the United States has tripled. Many rural telephone lines have been built, uniting groups of farmers with each other and with the nearest towns. Telegrams and telephone messages can now pass over the same wires without confusion. The automatic instruments dispense with the ordinary manual board, and this greatly reduces the staff required for operation. A device, called the telegraphone, records by varying degrees of magnetization on a moving steel wire, the message from a telephone. At any time afterward, this wire may be run through a telephone, repeating its message with a clearness thus far denied to the phonograph. This invention, by recording messages received during one's absence, opens an important field for the use of the telephone, especially in the news service.

The conveyance of sound by light is another marvel, and to Professor Bell, the originator of the telephone, this new device is to be credited. It is dependent on the singular property of selenium, by which variations in a

beam of light cast upon this new substance cause corresponding variations in its electrical resistance. A person speaks at a mirror which throws an intense beam of light to a distant mirror, in which a selenium focus is united to a telephonic receiver. It is declared that this apparatus has worked with success over a distance of 20 miles, and it may prove to be a valuable means of communication in war, in the lack of other resources.

The new Edison battery, which has been expected to be placed on the market for several years, is also exhibited. It is a steel-nickel storage weighing only 65 pounds for each horse power exerted one hour, and in view of its freedom from heat and odors, its safety and ease in management, it is preferable as a motive power to gasoline or steam. It is especially designed for automobiles, and it is hoped that it can be manufactured at a cost that will put these vehicles within the reach of the multitude.

Germany has sent a new kind of glass, that will not break when suddenly cooled or heated, and that opens further possibilities in the telescope, the microscope and the camera. An electric mine locomotive moves along with no trolley, trailing behind a feed wire which runs from a revolving reel, or winds up as the locomotive goes back and forth. There is also a regulator which keeps lights at a uniform brilliancy. It floats on a field of magnetism, and wavers up and down as the load on the generator varies with the switching of the lights on or off. The monorail car, a type of those designed to run between Liverpool and Manchester, (described several months ago in the INVENTIVE AGE) is also shown in operation. A "fool-proof" electrical switch, that will do no other than throw a current on by degrees, no matter how rashly a workman may wish to hurry the connection, is another exhibit that attracts daily attention. The turbine, which is destined to effect such changes in water transportation as well as in industries on land, is displayed to the gaze of those interested. The visitor comes away from the Fair with the impression that the departments in which machinery has not replaced human labor—if not human brains—are becoming few and far between.

Cellulose Gas Mantles.

A French inventor purposes to manufacture incandescent gas mantles out of cellulose, applied to a form, which he believes produces a much stronger and more durable article. The usual knit mantle, impregnated with salts of the rare earths, is replaced by a foundation made by applying a paste or solution of cellulose, with which are mixed the rare earths, to a fireproof form, and after allowing same to dry, burning off the organic matter in the usual manner.

IMPORTANT COURT DECISIONS

DECISIONS OF THE U. S. COURTS.

Supreme Court of the United States.

INTERNATIONAL POSTAL SUPPLY CO. OF NEW YORK *v.* BRUCE.

Decided May 31, 1904.

1. INJUNCTION—INFRINGEMENT OF PATENT BY GOVERNMENT—JURISDICTION OF COURT.

Where suit is brought against a postmaster alleging infringement of a patent upon a stamp-canceling machine and praying an injunction, *Held* that the Court has no power to grant an injunction.

2. SAME—SAME—UNITED STATES CANNOT BE SUED.

Where stamp-canceling machines are used by a postmaster in his work as an official of the Government, *Held* that the United States has a property in the machines which cannot be interfered with behind its back, and since it cannot be made a party, the suit asking for an injunction must fail.

MIFFLIN *et al.* *v.* R. H. WHITE COMPANY.

Decided June 1, 1903.

1. COPYRIGHT—PUBLICATION WITHOUT AUTHORITY OR ASSENT OF AUTHOR.

Where it appears that certain chapters of a book had been published in a magazine which had been copyrighted by the publishers thereof and that subsequently the whole book was copyrighted by the author, and it does not appear that the magazine publishers had the authority or assent of the author of the book to copyright it, *Held* that under the circumstances the copyright on the magazine did not afford protection to that part of the book which was published therein.

2. COPYRIGHT—STATUTORY RIGHT—STATUE CREATING RIGHT MUST BE COMPLIED WITH.

The right of copyright being purely statutory, the public may justly demand that the person claiming a monopoly of publication shall pursue, in substance at least, the statutory method of securing it.

Court of Appeals of the District of Columbia.

IN RE DAVENPORT.

Decided April 5, 1904.

1. INVENTION—AGGREGATION—DESK-PAD AND CATALOGUE.

An article consisting of a catalogue having a desk-pad bound to it as one of its covers *Held* a mere aggregation of unrelated elements and not a patentable combination.

2. SAME—SAME—SAME—MECHANICAL SKILL.

Not even the ingenuity of a skilled mechanic, much less the inventive faculty, seems to have been required to devise an aggregation or combination consisting of a catalogue and desk-pad bound together.

IN RE STARKEY.

Decided April 7, 1903.

1. REISSUE—BROADER CLAIMS—LACHES.

Where six years after the grant of a patent, application for reissue is made with broader claims, *Held* that the claims were properly rejected on the ground of laches.

2. SAME—SAME—SAME—DELAY OF TWO YEARS.

After the lapse of two years after the issue of a patent, a reissue which seeks to enlarge the claims of the original patent will not be granted, or if granted, will be held invalid unless special circumstances are shown to excuse the delay.

3. SAME—LACHES—MISTAKE AS TO SCOPE OF CLAIMS—MISTAKE OF LAW.

Where in excuse for delay in applying for a reissue it is alleged by the applicant that he did not know that his claims were narrow until a decision of a court, *Held* that the mistake, if any, was one of law, not of fact, and that ignorance of the law is no excuse.

4. SAME—MISTAKE BY ATTORNEY—APPLICANT RESPONSIBLE.

The attorney cannot be made responsible for mistakes in the case, since the client must be charged with the responsibility for the action, or inadvertence of the attorney.

5. SAME—LACHES—DELAY OF SIX YEARS—SIMPLE INVENTION.

Where there was a mistake as to the scope of the original claims, *Held* that there is no excuse for the failure to discover it for a period of six years, particularly where the patent was not difficult to understand and was often examined.

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MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been procured through the Patent Soliciting Office of E. G. Siggers, Patent Lawyer, Washington, D. C.

Thomas M. Griffin, Lenderman, South Carolina. Planter.—The planter of this patent is especially adapted for planting cotton seed, and is provided with means for distributing fertilizer in connection with the planting operation. The seed is deposited at regular intervals without scattering it broadcast, and means are provided for enabling the exact quantity of seed to be discharged. A rolling seed hopper of polygonal form is employed, and the discharge openings are located at the corners of the hopper.

Robert A. Thompson, inventor; and Raymond M. Dixon, assignee of one-half interest; Martinsburg, W. Va. Paper Box Covering Machine.—The machine of the present invention, in an ingenious manner, guides a plurality of strips of paper or other material for covering the sides of a box or lid, and it enables a pair of ornamental edge strips to underlie the longitudinal edges of the main strip in order that all three strips may be applied simultaneously to the box or lid. The guides of the machine are adjustable so as to accommodate any width of main strip, and the guides for the ornamental edge strips are simultaneously adjustable with the guide for the main strip, in order that the edge strips may always bear the proper relation with respect to the main strip.

Ezra Liken, Barkeyville, Pa. Friction Clutch.—The clutch of the present invention is adapted to be readily set up either at an intermediate point of a line-shaft, or at the point of coupling between the fly-wheel or drive disk of a gas engine and a power-shaft. The friction surfaces of the device are so arranged that a clutch of a standard size will fit pulleys of different sizes, whereby all the connecting parts between the friction member and the controlling lever may be made in a single standard size, instead of requiring different sizes of pulleys. Means are provided for automatically shifting the pulley out of engagement with the stationary clutch member, when the movable clutch member is being withdrawn from engagement with the pulley, to insure a prompt disengagement of the pulley from the stationary clutch member.

Thomas Denoyer, inventor; Prim Gagnon, assignee, Papineau, Ill. Automatic Valve Operating Mechanism.—This invention is an automatic device for shutting down a gasoline engine in any one of a series of contingencies. In the illustrated embodiment of the invention the power mechanism is arranged to be tripped for the purpose of closing the throttle and burner valves, as well as the water valve, controlling the supply of water to the cooling jacket, and the lubricator valve which controls the lubrication of the cylinder. The tripping device is designed to be operated, as for instance, by a float, which, when raised by the water pumped into a tank, automatically effects the release of the power mechanism which at once closes the valves to stop the engine.

Charles L. Ferriott, inventor; Julius Dodt, assignee, Bartlett, Texas. Insect Collecting Machine.—Mr. Ferriott has invented an effective machine for collecting the boll-weevil, and other insects, from cotton, or other growing plants. Mounted on a suitable wheeled frame, which is designed to be drawn by draft animals, is a blower arranged to induce a suction through

branches, each having a downwardly pneumatic tube provided with three open funnel-shaped nozzles. Two of these nozzles are disposed in close proximity to the ground at opposite sides of the row of plants, and the third nozzle is disposed directly above the plants. The blower is connected to the wheels of the device so that, as the machine is drawn across the field, the blower will draw the insects and infected vegetation into the nozzles and will blow the same back to a separating chamber, where the dust will be separated from the insects, and from whence the insects will be deposited in a suitable bag or other receptacle to facilitate their subsequent destruction.

John Gross, Carroll, Ia. Hay Loader.—This invention is a simple apparatus designed to be drawn over a field by a wagon for the purpose of raking up the hay and delivering it automatically to the wagon as the latter advances. In a suitable wheeled frame is mounted an endless conveyor provided with transverse rows of teeth and operated from the wheels of the loader. At the lower rear end of the loader frame is mounted a swinging rake which gathers the hay and serves to deliver the same to the conveyor. The hay thus delivered is carried forward to a rotary distributor, operated by the conveyor and arranged to properly distribute the hay and to deliver the same to the wagon. The loader is equipped with devices for raising and lowering the loader frame and for throwing the conveyor into and out of gear with the wheels.

Ernest O. Hutsell, Athens, Tenn. Uncoupling Device for Cars.—This patent covers a novel and ingenious device for uncoupling cars. The device, which is adapted to be readily applied to cars equipped with the usual car couplings, is capable of being set for automatic operation while the cars are in motion, and when the draft mechanism is under tension. As soon as the cars stop, or the strain is otherwise removed from the draft mechanism, the operation of uncoupling will be automatically effected by the device, thereby obviating the necessity of, and the danger incident to, a trainhand running along the side of a car and holding the uncoupling mechanism until the car coupling is free to uncouple.

John B. Neuendorff, San Antonio, Texas. Steam Spray Oil Burner.—This invention relates to oil burners of the injector type, and mixes liquid fuel and steam in a novel and effective manner within a chamber, whereby an intense flame is produced at the mouth of the discharge nozzle. The parts of the burner are detachably connected in order to afford access to the interior for purposes of cleaning, and also to enable any obstructions to be removed from the oil and steam inlet passages. The discharge nozzle produces a fan-shaped flame, and is adjustable to vary the angular disposition of the flame for increasing the effectiveness of the burner.

Joseph G. Elderkin, Fox River, Nova Scotia, Canada. Raft.—Ocean-going rafts of timber are common, particularly along the Pacific coast; and, while this means of transportation is much more inexpensive than carrying the same by vessels, various drawbacks have heretofore arisen, chiefly in view of the fact that a large amount of timber has been made valueless or greatly injured by the chaffing of the binding means thereupon. Furthermore, it has been necessary to build the entire raft complete at one place. These drawbacks are overcome by Mr. Elderkin in his invention. He provides a raft which is very strong, doubly bound together, and will move easily through the water. The different grades of timber

can be assorted and kept separate, and the raft is built up of layers, so that when one or more are built, the raft can be moved from one place to another and partially completed, or entirely finished. In like manner, it can be taken apart, section by section, without mixing the timber, and parts may be removed without breaking up the raft as a whole. These features will appeal to lumber and towing companies interested in this class of structures.

William C. Lawson, Rural Retreat, Va. Two patents.—The first patent relates to a connection for hames, collars and the like, and, while specific in its nature, embodies a combination of features that is certainly novel. The members to be connected are provided with sleeves, one of which is adapted to slip over the other. Within one sleeves is located a pivoted hook that is adapted to engage over a cross pin carried by the other sleeve. A spring located within the sleeve having the hook, bears at one end against said hook, while its other end projects through the sleeve and constitutes a stop for limiting the sliding movement of the sleeves towards each other.

The other patent covers means for connecting traces to hames. The invention consists of a staple attached to the hames, and a guard plate located on the traces and held in place by the staple, one portion of this guard plate being slitted to provide an upwardly projected yielding tongue, located within the staple, and having an outturned stud that is adapted to abut against the staple. This disposition of parts affords a secure attachment for a trace hook, and permits the vertical adjustment of the same.

William A. Feurt and Henry H. Martin, Maryville, Mo. Gas Generator.—There are many features of novelty embodied in this latest acetylene gas generator of the above named inventors. In the first place, they have a peculiarly efficient carbide feeder, consisting of a flat floor or platform upon which the carbide gravitates from a holder. On this platform is mounted a reciprocating scraper, operated from the gas bell, and arranged to feed the carbide to the generating chamber at proper intervals and in requisite amounts. The gas generated is thoroughly cooled before passing to the gas holder, and a novel seal is employed for preventing its return into the generator.

Samuel A. Jones, Deshler, Ohio. Mail Box.—The invention relates to that class of mail boxes used in rural mail delivery systems, and has more particular reference to a simple automatic signal. A cover is employed beneath which is rotatably mounted the mail-holding receptacle having a mouth that is normally closed by the cover, but is exposed when the receptacle is rotated. A signal arm is pivoted between its ends at one end of the cover and has a target at one end, the other end being engaged by a projecting device carried by the receptacle and constituting part of the locking means. With this construction, after the signal has been set, when the box is opened by the collector, the projection automatically disengages from the signal and the signal drops to an inoperative position.

Samuel A. Jones and Fletcher W. Downham, Deshler, Ohio. Cream Can Connection.—This invention relates to cream cans, more especially the means for connecting an inner can or receptacle, which contains water or other cooling liquid, and it enables a perfectly water-tight joint or connection to be quickly effected without the use of washers, gaskets, screws, or other fastening devices. The inner receptacle may be quickly applied to, and removed from, the outer receptacle, and there is no liability of the parts

of the joint or connection becoming accidentally disconnected. The parts of the joint are tightly wedged together, and the inner can is firmly held in position so that it cannot, when empty, be accidentally floated out of engagement with the outer can.

Harry R. Decker, Beaumont, Texas. Oil Well Drill.—This patent shows a marked advance in the development of oil well drills. The invention relates particularly to rotary drills for operating where the formation is of an alluvial nature with sand and clay deposits, and where it is necessary to rotate continuously a drill pipe, through which a continuous flow of water is maintained, for removing from the well the sand and clay ground or mixed up by the bit or rotary shoe of the drill pipe. The invention provides exceedingly simple, inexpensive and efficient means for effectually anchoring the drill pipe within the well casing, for preventing the oil from flowing out at the top of the well and interfering with the operation of the drilling apparatus, for controlling the flow or output of the well, and at the same time for enabling any excessive gushing tendency to be checked. The apparatus enables sand and oil-producing wells to be successfully drilled and operated, and it is provided with means for enabling the sand of the stratum containing oil to be continuously agitated after a well has been drilled. It supplies an artificial lift where the natural pressure of the oil and gas is insufficient to cause the sand and oil to flow from the well.

Harry Drewery, Soda Springs, Idaho. Condiment Holder.—The device of this patent enables a number of articles, such as pepper, salt, etc., to be separately held within a single container, and individually delivered therefrom in a convenient and effective manner. The body of the container or receptacle is provided with a series of separate compartments, and the cap or cover, which is perforated, and which is adapted to be secured to the container similar to the cap of an ordinary condiment holder, is provided with a series of independently operable closures corresponding to the compartments, and adapted to permit the contents of any one of the compartments to be shaken from it.

August F. Tank, Snover, Michigan. Road Machine.—This invention relates to that class of road-working or grading machines employing scrapers, and the object secured is a novel structure having simple and efficient mechanism for adjusting the scraper blade to the several positions necessary, in order that it may meet the requirements of the surface operated upon. The inventor employs a suitable body supported on wheels and carrying a frame, the front end of which is vertically adjustable in a novel manner. This frame consists of divergently disposed side bars carrying at their rear ends a turntable having a circular rack and carrying the scraper blade. The table is rotated by a shaft having a pinion at its lower end that engages the rack, and a hand-wheel at its upper end that is disposed conveniently to the operator. A lock is employed for securing the turntable in different positions in order to prevent the accidental movement of the scraper. The rear end of the frame can be raised or lowered by gearing connected thereto, and having hand wheels arranged at the platform for the operator. The turntable and frame carrying the same are laterally adjustable, being connected to a block having threaded engagement with a worm shaft arranged beneath the platform and operated by the upright hand wheel shaft. The rear axle is adjustable longitudinally of the machine, being provided with a rack engaged by the pinion of another shaft.



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FOR SALE—Patent No. 756,213, dated April 5, 1904. Surgical Knife. Very convenient for surgical and dental use. Address, S. A. Connel, Jr., 233 K. K. Ave., Las Vegas, New Mexico. sep

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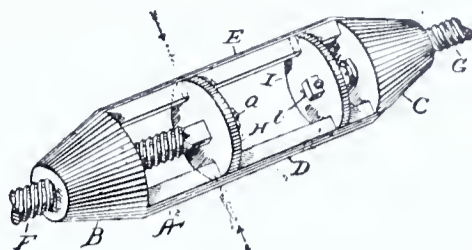
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WASHINGTON, SEPTEMBER, 1904.

AN IMPORTANT DECISION.

Injunction will not Lie Against the Government for Infringement of Patent.

In another column of the AGE we print the syllabus of the decision of the Supreme Court of the United States in the suit of the International Postal Supply Company of New York against Bruce, the Postmaster at Syracuse, N. Y.

In substance, the complaint was that the defendant used in the Post Office at Syracuse, N. Y., two machines which infringed the complainant's letters patent, and an injunction was prayed for by the complainant against the further use of said machines.

It appears that the defendant never personally used the stamp-cancelling and postmarking machines, but the use of the said machines in the Post Office at Syracuse was by some of the defendant's subordinates, who are employees of the United States Government, such use being in the service of the United States.

The machines so used were hired by the United States Post-Office Department for a term of years, which is as yet unexpired, from the manufacturer and owner of said machines, for an agreed rental, which is payable on the order of the Post-Office Department, by whose order said machines were placed in the Syracuse Post-Office and were and are now used there.

The case was argued before the lower courts and certified by the United States Circuit Court of Appeals for the Second Circuit, for the purpose of obtaining the instructions of the Supreme Court of the United States on the following question: Has the United States circuit court the power to grant an injunction against the defendant retaining the use of the machines? The Court held that it has no power to grant an injunction, making it necessary for the complainant

to adopt some other form of action: for instance, the patentee will have to file a suit claiming damages against the infringer.

Justices Harlan and Peckham dissented from the decision of the Court, and stated:

"I submit that the immunity of the United States from direct suit is an all-sufficient reason why the Court shall lay its hands upon the defendant, who happens to be a local postmaster, and prevent him by injunction from disregarding the admittedly legal rights of the plaintiff. No other remedy is adequate. If that relief cannot be granted, then the rights of all patentees, whose inventions can be used in the prosecution of the business of the Government, are subject to be destroyed by the arbitrary action of heads of departments and their subordinate officers.

"I am of the opinion that every officer of the Government, however high his position, may be prevented by injunction, operating directly upon him, from illegally injuring or destroying the property rights of the citizen; and this relief should more readily be given when the Government itself cannot be made a party of record.

In my judgment, it is not possible to conceive of any case, arising under our system of constitutional government, in which the courts may not, in some effective mode, and properly, protect the rights of the citizen against illegal aggression, and to that end, if need be, stay the hands of the aggressor, even if he be a public officer, who acts in the interest, or by the direction of, the Government."

Notwithstanding the fact that the Supreme Court decided this case against the complainant, the dissenting opinion of Justices Harlan and Peckham carries more weight with us than the majority opinion of the Court. We believe that the Supreme Court erred in refusing to grant the injunction prayed for by the complainant.

COPIES OF PATENTS.

The attention of our readers is invited to the advertisement headed "Drawings for Inventors," printed in another column of this paper. It is now exceedingly difficult to obtain more than ten copies of any one patent from the United States Patent Office, and yet it frequently happens that the inventor wishes as many as fifty or one hundred copies. We are able to supply the inventor with as many copies of his patent as he wishes, the same to be printed exactly like the United States Patent Office copies, by the lithographers who formerly attended to the Patent Office work. The copies of patents furnished by us are guaranteed to be as good, if not better, than those supplied by the Patent Office.

The price will vary with different patents, for in some cases we will have to charge more than others: for instance, where a patent contains six sheets of drawings and eight pages of specification, we would be obliged to charge more than where a patent only contains a single sheet of drawings and two pages of specification.

Correspondence with inventors is invited, and a prompt reply will be given to any inquiries along this line.

REPORT OF THE CANADIAN PATENT OFFICE.

We are in receipt of a report from the Commissioner of Patents of the Patent Office of the Dominion of Canada, showing the condition of work at the close of business October 31st, 1903. The tables furnished show that there has been a large increase in the transactions of the Patent Office during the past year. The report discloses a surplus of receipts over the expenditures, and, in this respect, follows very closely that of the United States Patent Office. A surplus of over \$82,000 was turned into the Dominion treasury by the Canadian Patent Office last year.

Of the total number of patents granted during the year, seventy per cent were issued to inventors residing in the United States, thus showing that the inventors of this country largely support the Canadian Patent Office, and contribute materially to the surplus which that Office produces.

The Commissioner reports that the classification of Canadian patents from June 8, 1824 (the date of the first Canadian patent) to October 31, 1903, has been completed, and is now in the hands of the examiners of the Canadian Patent Office, and is being continued as the patents are issued. The classification of the patents has been a very onerous undertaking, embracing as it did, all Canadian patents from the beginning of the Patent Office down to the present period. The time and expense involved in the preparation of this compilation will, however, be amply repaid in its usefulness to the examiners in the discharge of their duties, insuring a more reliable examination and a great saving of time in making the necessary researches.

The Commissioner calls attention to the necessity of patentees remitting the partial fees before the expiration of the six and twelve year terms, as the Commissioner is not vested with discretionary power, under any circumstances, to revive the patents should the fees be not paid in time. A revival of a patent can only be secured by a private Act of Parliament, the obtainment of which entails considerable expense to the patentee, and is very seldom successful. Therefore, if the tax is not paid prior to the end of the term of six or twelve years, the patent expires in Canada and cannot be revived.

As is well known, under the Canadian law, a patentee is given one year within which to import samples of the invention to Canada, and two years within which to manufacture the invention in Canada. The law, however, permits an extension of time to be granted by the Commissioner under certain circumstances. Formerly, these extensions were granted almost as a matter of course, but in consequence of an opinion given by the Department of Justice on the 9th of April, 1903, to the effect that the Canadian Patent Office had, up to that time, given too liberal an interpretation of the law in dealing with applications for extensions of time to manufacture and import, the practice of the Canadian Patent Office in that regard has been changed. Since that date, the law has been applied strictly, and ap-

plications for extensions have been granted only when the applicant has clearly established, to the satisfaction of the Patent Office, by affidavit or solemn declaration, that the failure to manufacture or import was due to no fault of his, but to reasons beyond his control. The Commissioner states, that while these applications continue to be quite numerous, it is "seldom that such a case is made out which warrants the granting of the application."

It follows, then, that all parties who apply for, and secure, Canadian patents will have to respect the Canadian law and cease importing samples of the invention within one year after the dates of their Canadian patent, and should arrange to commence the manufacture of their inventions in Canada within two years from the dates of their patents.

The Commissioner refers to Sec. 7 of the Patent Act of August 13, 1903, in which authority is given to the Patent Office, "having due regard to the nature of the invention," to place certain patents under the conditions of the license system, instead of being subject to the manufacturing conditions set forth in Sec. 4 of said Act. Since the Act of 1903 went into effect, a very large number of applications have been received from patentees to have their patents made subject to the license conditions, and in dealing with these applications, the Commissioner says that the requirements of the law in regard to the manufacture of inventions have been kept in mind, and that the applications which have been granted are those relating to inventions such as the following: "An art or process; improvements on a patented invention when both patents are not held by the same person; appliances or apparatus used in connection with railways, telegraph, telephone and lighting systems, and other works usually under the control of public or large private corporations, and which appliances or apparatus cannot be installed or constructed without the consent of such corporations; and certain inventions which are manufactured or constructed only to order, and are not, according to custom, carried in stock."

It seems to be plain that it is practically useless to apply for extensions of the manufacturing and importation periods, unless it can be made absolutely clear that the failure to manufacture or import was not due to the fault of the patentee. It is equally plain that there is no use of filing a petition to have the patent brought under the provisions of Sec. 7 of the Patent Act of August 13, 1903, unless the invention comes within the classes specifically mentioned by the Commissioner. If the invention covered by the Canadian patent is embraced in said classes, such application should be made, for the reason that the granting of the petition will make it unnecessary for the patentee holding the Canadian patent, to manufacture the invention in Canada.

THE INVENTIVE AGE contains sound advice to inventors and patentees. For lack of such advice many have lost money. Subscription, one dollar a year.

REPORT OF LIBRARIAN OF CONGRESS.

The Librarian of Congress has submitted his report for the fiscal year ending June 30, 1904, and it shows that for the period mentioned, the copyright business was the largest during any one year in the history of the Copyright Office, the entries having exceeded the one hundred thousand mark (103,130,) and the net amount of fees being \$76,629. The number of articles deposited during the year, also exceeded the number in any previous year, amounting to 164,799 articles. The total number of registrations made in the Copyright Office from July 10, 1870, the date of the first registration, to June 30, 1904, thirty-four years, is 1,518,605; while the total applied fees for these entries amounted to \$1,101,290.

A comparison between these figures and the Patent Office reports shows a wide disparity. The patent system dates from 1836, since which time there have been over 750,000 patents issued. The Patent Office annually turns back into the Treasury, an amount equal to the total amount of fees received for copyrights. The Patent Office is, therefore, more than self-sustaining; whereas, we should judge, from the figures already given, that the Copyright Office is not.

The copyright business has been systematized and materially improved within the last seven years. At one time it was possible to obtain copyright protection on anything, but this has been materially modified, not by virtue of any statutory enactments, but because of the different views entertained by the present Registrar of Copyrights from those of the former Librarian of Congress. Forms of application have been devised to suit different subjects-matter, and the practice has been clearly defined in certain rules and regulations which have been established.

There is still one defect, however, that ought to be remedied. It is impossible for an intelligent search to be made to determine the validity of a copyright. It is a well-known fact that the Copyright Office makes no search for the purpose of ascertaining if the matter submitted for copyright entry has ever been filed before, and the result is that there are in many instances, cases where the same title and practically the same subject-matter, has been entered more than once.

While we are not advocating the institution of a search on the part of the Librarian of Congress, we do think that facilities ought to be provided so that attorneys and others who may wish to make an examination of the copyright records for the purpose of determining whether a copyright is valid or not, or if copyright entry should be made on a proposed title, may be able to do so. As it now stands, an applicant must take the chances of someone else having copyrighted the same subject-matter prior to his entry.

New Treatment for Tuberculosis.

From Berlin comes a report of a new method of treatment for consumption of the lungs, originated by Prof. Jacob, first physician of the hospital "Charity," who lectured recently before the Berlin Society for Internal Medicine.

Prof. Jacob started his lecture by stating that the remedies usually employed do not reach the location of the disease, and he, therefore, conceived the idea of introducing medicaments directly into the lungs. Through numerous experiments on animals, he became aware that such injections are very well borne by animals. The manipulation is very simple, and can be undertaken by every physician who is familiar with the use of the ordinary throat mirror. After the trachea and larynx have been made insensible by cocaine or anesthine, a thin rubber tube is introduced into the lungs and the medicine is injected through it. The whole process lasts hardly ten minutes.

Prof. Jacob has found that the most efficient remedy is the well-known "tuberculine" which Prof. Koch used thirteen years ago, and that the next in efficiency is creosote. He succeeded in this way in making the tuberculosis bacilli disappear completely in from four to eight weeks. So far, he has treated only five persons by his method, though he expects its general adoption. He added that through this new method, a safe diagnosis can be made of consumption of the lungs, while this has, so far, not been possible. Heretofore, tuberculine was injected hypodermically to demonstrate whether a person suffered from tuberculosis. Not only is his method valuable then, as a remedy for tuberculosis, but it is of importance in determining whether tuberculosis of the lungs exists.

Convenient Postal Device.

Word comes from Australia of a new application of the principle of the coin-in-the-slot machine. It consists of an improved letter box, adapted for use in localities where it is not convenient to obtain postage stamps. By dropping a letter in one slot, and a penny in a second slot, the words "one penny paid" will be found impressed on the envelope when the box is opened by the post-office authorities, thereby securing transmission of the letter.

A New Premium Offer.

The attention of our readers is invited to the advertisement of Webster's Dictionary, on the last page of this paper. As is well known, Webster's Dictionary usually retails for \$9, and the opportunity to obtain a dictionary, and a year's subscription to the INVENTIVE AGE, for \$2.75 is therefore unprecedented.

There is no catch in this proposition. It is straight business. Of course, the dictionary is not a \$9 dictionary for \$2.75, though it is just as good for many purposes as the dictionary you would have to pay \$9 for, and it will answer every purpose of the \$9 dictionary. It is the cheapest proposition in the book line on the market today.

A Novel Beam.

A combined steel and concrete beam has recently been patented by Julius Kaln, of Detroit, Michigan. In carrying out the invention, a main longitudinal bar is employed, of round steel or similar material capable of resisting tension stresses. The bar is provided at points intermediate its ends with washers which may be used in any desired number and placed at any distance apart, either uniformly spaced or preferably closer together at the ends of the bar. The washers are square with a circular opening in the center to fit on the bar, which will also be circular in cross section. After the washers have been placed on the bar, an upsetting, distortion, or deformation of said bar, is made on either side of the washers for the purpose of holding them securely in position by placing the bar between two pairs of dies, the washer being between the pairs. When the dies are closed, a portion of the bar is squeezed out radially so as to form a lug or ear on each side of the washer, thereby rigidly securing the washer in place on the bar without reducing the cross sectional area. To form the beam, the tension bar is suspended or otherwise supported in and near the bottom of the mold, and concrete rammed around it, which, when setting, unites with the tension member, forming a beam of great strength, the tension member being below the neutral axis of the beam.

Artificial Rubies.

Artificial rubies are made by a process of the chemist Verneuil, by melting a mixture of clay and oxide of chromium at an even temperature of several thousand degrees. The two substances are carefully placed above each other in layers so as to prevent cracking in the crystallized mass.

It is stated that Verneuil finally succeeded in producing an artificial ruby weighing 5 pounds, which had a value of about \$600. From this price it may be judged that the product is not first class, and probably just pays the costs of manufacture. In order to produce the exceedingly high temperature which is indispensable for success, Verneuil uses a blast of oxyhydrogen gas, which acts directly on the mass from the top. The hardness of the ruby is the result of quick cooling caused by sudden interruption of the blast of oxyhydrogen. The artificial ruby is said to be very pure and brilliant, possessing all the physical properties of natural rubies. It can be cut, and takes a very fine polish. In view of these assertions, it seems singular that artificial rubies have no higher value, especially as the natural article is so exceedingly high-priced at present.

Egg Tests.

A new and simple method for testing eggs is published in German papers. It is based upon the fact that the air chamber in the flat end of the egg increases with age. If the egg is placed in a saturated solution of common salt, it will show an increasing inclination to float with the long axis vertical. A scale is attached to the vessel containing the salt solution so that the inclination of the floating egg toward the horizontal can be measured. In this way the age of the egg can be determined almost to a day. A fresh

egg lies in a horizontal position at the bottom of the vessel: an egg from 3 to 5 days old shows an elevation of the flat end, so that its long axis forms an angle of 20 degrees. With an egg 8 days old the angle increases to 45 degrees; with an egg 14 days old to 60 degrees; and with one 3 weeks old to 75 degrees: while an egg a month old floats vertically upon the pointed end.

PAPER FROM PEAT.

Another Use Found for Common Swamp-Product.

Peat has hitherto been used chiefly as fuel: sometimes, in a dry, pulverized condition, as litter for stables and stockyards. During and since the coal famine of a year ago, many schemes were suggested by which it may be utilized to serve as an excellent substitute for anthracite and bituminous coal. Mr. Edward Atkinson as a result of his investigations into the matter has claimed that we possess a vast store of riches in the swamps and peat areas of New England and other sections of the country, and that we can become practically independent of the coal barons and their working legions whenever we see fit, by a very simple and inexpensive process to convert the swamp mud around us into first-class fuel.

But now another use, and a most extraordinary one, has been found for it by certain experimenters in Ireland. It makes an excellent quality of paper. A great mill, 1,100 feet, of four stories equipped with machinery, was established a few months ago at Celbridge, County Kildare, which has been engaged in converting Irish peat into wrapping paper of various grades. The mill site is on the River Liffey, about twenty-five miles from Dublin, near the eastern margin of the great bog of Allen which extends westward about seventy miles to the River Shannon. The motive power is both steam and water. Only the energy of the river generates a certain volume of electric force sufficient for present needs. About seventy hands are now steadily employed in this new enterprise.

The process of converting the peat into paper is a wonderful metamorphosis. Carts are engaged hauling the raw peat from the bog, where it is dug, direct to the mill. Then begin the various processes of cooking with the necessary chemicals until it becomes reduced to the condition of pulp required, after which the methods followed are very similar to those of the ordinary paper mill. It is somewhat of a singular sight to see the black peat fresh from the bog thrown into the mill at one end and follow it to the other end where it emerges as paper. It is claimed for the new industry, this latest discovery, that it will prove an opulent mine of wealth among the Irish people. Certainly the raw material is at hand in great abundance in the ample boglands of the island. And certainly the conversion of peat into paper as a profitable practical business is more than a little startling. But it is said that several of the Dublin wholesale paper houses are back of the enterprise, and that its success is substantially assured.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE. This keeps inventors and manufacturers posted in the art in which they are most interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy; twenty copies \$1.50.—Please give correct data in ordering.—Address,

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Steam shovel.....G. W. King
Steam superheater.....E. Pielock
Steam trap.....J. Morehead
Steering wheeling. Tilting.....T. W. & H. L. Warner
Stocking supporter.....G. Beeler
Stone making machine. Artificial J. B. Oliver
Stone molding machine. Artificial.....N. F. Palmer
Storage battery.....T. A. Willard
Storage battery.....I. Kitsee
Stove heat concentrating attachment. Cooking.....J. E. Compton
Stove. Heating.....J. H. Black
Stove or furnace magazine. Heating E. Schoup
Stuffing box gland.....H. Turnbach
Sucker rod coupling.....E. A. Guy
Surgeon's operating table.....S. G. Scanlan
Surgical instrument.....C. H. Emerson
Suspender end runner.....J. J. Buchanan
Suspender fastener.....T. W. Baugh
Suspensory.....E. W. Munsey
Switch point shifter.....R. H. Roberts
Switching mechanism. Electro fluid pressure.....W. J. Bell
Syringe.....T. H. Ellis
Syringe. Injection.....A. Dreyer

Table lock. Extension.....A. L. Crandall
Tap. Vanishing thread.....H. R. Borie
Teaching device. Penmanship. F. C. Young
Telegraph pole.....E. F. Tafel
Telegraphic transmitter.....W. E. Miller, Sr
Telephone booth electric light. Automatic.....J. L. Bolan
Telephone desk set.....P. C. Burns
Telephone switchboard apparatus.....E. H. Smythe
Telephone switchboard apparatus.....F. R. McBerty
Telephone toll register and electrical system for controlling same.....H. D. Streud
Telephony.....I. Kitsee
Tension device.....D. J. Scott et al
Thermostat.....W. P. Powers
Thill coupling.....J. P. Hollopeter
Thread and tape stand.....W. H. Stedman
Threshing machine feeder.....J. M. Sailer
Threshing machine self-feeder.....D. C. Ruth
Ticket. Railway.....J. H. Lord
Tie.....A. C. Shand
Tie and rail fastener. Combined.....H. V. Mordaunt
Tile turning apparatus.....D. F. Henry, Jr
Tire. Pneumatic.....H. G. Fittler
Tire. Vehicle.....G. H. Sherman
Tires to wheels. Means for attaching elastic.....H. Sheaf et al
Tobacco stripping machine.....J. G. Havens
Tool. Machinist's combination.....S. Friedman
Tool motor.....W. H. Roes
Torch. Blow.....A. Prinsen
Toy pistol.....J. Lucas
Traction engine.....E. F. McIntire
Trap.....J. A. Kray
Trap.....A. Zeiger
Trestle. Folding extension.....2 pats.....W. G. Read
Trolley.....G. E. Smith
Trolley fork.....C. G. Hartman
Trolley guard.....A. Christensen
Trolley harp.....C. L. Hooper
Trolley. Overhead.....W. J. Summer
Trolley. Overhead track.....W. J. Summer
Trolley pole head.....2 pats.....J. E. Greenwood
Trolley retractor.....R. H. Ham
Trolley track. Overhead.....A. J. Glor et al
Trolley track switch. Overhead.....W. J. Summer
Truck and brake. Car.....G. Rouy
Trunk. Car.....R. H. Parks
Trunk.....J. P. Clark
Trunk attachment.....O. A. Bremer et al
Trunk, &c. catch.....J. P. Clark
Tubes. Apparatus for forming tapered.....E. F. Tafel
Tuck comb.....2 pats.....H. S. Zinn
Tunnel or like construction.....E. Diebitsch
Tunnels or the like. Apparatus for building.....E. Diebitsch
Turbine.....D. McArthur
Turbine.....R. H. Goldsborough
Turbine. Steam.....P. J. Hedlund
Twisting apparatus. Yarn.....A. E. Rhoades
Type casting and composing machine.....M. Wehrlin
Type casting and composing machines. Automatic clutch for.....M. Wehrlin
Type writer cabinet.....W. Horrocks
Type writing machine.....J. Felbel
Type writing machine.....C. J. Bond
Valve Air brake pressure reducing.....G. W. Kaiser
Valve. Automatic relief.....A. Anderson
Valve. Check.....A. Stenwall
Valve. High speed pressure reducing.....G. W. Kaiser
Valve. Self closing stop.....C. Hundt
Vanadium and its alloys. Manufacturing.....G. Gin
Vehicle. Flower bearing.....F. Bublitz et al
Vehicle. Motor.....E. S. Lea
Vehicle wheel.....A. Proustov
Vehicles. Fitting for preventing side slip in motor.....W. Rourke
Vending machine.....H. S. Baughman
Vending machine. Automatic.....F. Janata
Vending machine. Coin controlled.....A. H. McMillan
Vending machine coin mechanism.....F. J. Rowse
Violin bow.....A. W. Carlson
Vitascope.....T. Armat
Wagon body.....S. I. Thomas
Wagon box.....C. W. Lampher
Wagon box. Convertible.....S. C. Paulson
Waist skirt pin and garment supporter.....M. E. Kintz
Warp yarn slasher.....A. E. Rhoades
Washing machine.....J. I. Moreland
Washing machine.....J. M. King
Watch.....L. E. Favre
Watches or other mechanisms. Click for.....F. R. Cunningham
Water meter.....5 pats.....F. Lambert
Water or sewage. Apparatus for distribution and purification of.....S. F. Van Choate
Washing attachment. Refrigerator.....W. H. Mitchell
Well drill. Hydraulic.....J. O. Jones
Well packer. Deep.....L. E. Robinson et al
Well strainers. Means for cleaning C. Shaw
Well beater.....E. Erickson
Wheel.....C. E. Hequeubourg
Wheel rim. Vehicle.....F. A. Seiberling
Wind direction and wind velocity indicating apparatus.....G. A. Owen
Wind motor.....J. J. Fischer
Windmill.....J. W. Currie
Windmill.....J. F. Hughes
Windmill.....L. W. Noyes
Windmill regulator.....C. E. Piepmeier
Winding and rewinding mechanism.....F. W. Draper
Window. Vertically pivoted.....J. E. McGinness
Wire reeler.....K. R. Lerol, Jr
Wood and its product. Treating.....J. H. Stewart
Wrench.....D. D. Getman

Wrench.....F. P. Stevenson
Wrench.....C. C. Cooper
Wrench.....M. J. McDermott

DESIGNS.

Badge.....P. Davidson
Badge.....C. L. Thatcher
Chimney top.....W. Porten
Coin actuated machines.....C. R. Reid
Doll holder.....E. J. Bush
Finger ring.....R. F. Outcault
Glass vessel.....5 pats.....P. Ebeling
Hat ornament.....C. Nuebling
Mat.....J. E. MacMurray
Radiator.....R. Martindale
Snap hook and trace end retainer.....H. M. Powers
Trimming.....S. Isaac

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Acid. Making omega cyanmethyl-anthranilic.....O. J. Gaul
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Adding machine.....R. E. Weston
Aerating regulator.....F. Brogniez
Alarm device.....G. M. Mayer
Anthraquin. Making.....R. E. Schmidt et al
Anvil.....C. W. Moser
Automatic regulator.....T. E. Hunt
Axles, &c. Pillow or bush for vehicle.....J. H. Monbeig et al
Bag holder or stand.....C. W. Lampher
Bag holding apparatus.....C. T. Holman
Baling press.....R. P. White
Baths. Preparing compositions for sulfur.....W. Matzka
Battery transmitter.....R. Hansen
Bed.....W. E. Collier
Bed rail fastener.....W. Storch
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Binder draft attachment.....J. S. Randall
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Block system of control. Electromagnetic.....G. Thompson
Boiler superheater. Steam.....F. J. Cole
Book cover and binding.....A. E. Edmondson
Book. Manifolding sales.....E. M. Wilkey
Book. Railway guide book, catalogue, or kindred reference.....R. M. Richardson
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Bottle.....E. Burns
Bottle.....R. D. Pike
Bottle. Non refillable.....O. Reiter
Bowling game.....P. J. Duerr
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Bread cutter.....G. I. Herrick
Breaching strap holder.....J. W. Adams
Bromin into bromids and bromates. Converting.....H. H. Dow
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Broom holder.....C. E. Pope
Brush holder.....R. Siegfried et al
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Building block molding machine.....L. P. Normandin
Building construction.....T. O'Shea
Burial robe.....W. J. Worden
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Button setting machine attachment.....M. S. Elliott
Cabinet.....E. Krom
Cabinet and rack for holding implements, &c. Combined.....A. A. Low
Cabinet Garment.....G. Grossman
Camera vignetter attachment.....H. C. Gregg
Can closing machine. Friction top.....J. F. Kurfies
Can filling machine.....C. S. Bucklin
Can opener.....F. White et al
Car coupling.....O. Hecathorn
Car coupling.....reissue.....W. Kelso
Car replacer.....W. E. Burroughs et al
Carbon break switch.....C. C. Badeau
Carbon dioxide from alkaline carbonates. Removing.....H. E. Dow
Carbureter.....A. S. Avery et al
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Carding machine feeding mechanism.....T. Kershaw
Cart. Ash.....J. C. Lehr
Cash, &c., in stores or like places. Apparatus for transmitting.....H. Lough
Cash recorder.....S. A. Creelman
Cash register.....C. H. Smith et al
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Casket.....J. D. Ripson
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Chimney. Mica.....J. D. Warren
Chrysazin. Making.....R. E. Schmidt et al
Churn. Shaking.....R. W. Park et al
Cleat forming machine.....W. B. Jones
Clip for holding papers, clothing, &c.....F. M. Bulkley
Clock. Electric secondary.....F. I. Getty
Cloth cutting machine.....F. Baumann, Jr
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Clutch mechanism.....A. P. Morrow
Cock. Gage.....S. J. Dunlop
Cocks. Means for removably mounting gage.....J. R. Tyson
Collapsible box.....R. A. Crutchfield
Collar. Horse.....A. G. Couch et al
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Commode. Portable.....B. A. Randolph
Compass.....G. I. Herrick
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Concrete constructor.....T. Haulon
Condenser.....T. M. Eynon
Conduit.....J. D. McNab
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Corn holder.....H. L. Haynes

Corn husking machine.....L. Rasmussen
Crane Traveling.....C. H. Turver, Jr
Crucible furnace.....C. W. Speirs
Cultivator cleaner.....C. J. Walsh
Cutlery polishing machine.....C. L. Joy
Cyclic ketones. Making.....P. Chnit et al
Dental duct appliance.....F. P. Abbott
Display rack holder.....E. Bollhoefer
Door.....A. Ritter
Door check.....F. G. Neuberth
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Drawers. Woman's.....H. M. Chittenden
Drum. Heating.....R. C. Doenitz
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Drying and heating system. Steam.....R. Goodwin, Jr
Dye and making same. Azo.....P. Julius et al
Dyeing skins. Machine for.....P. Bruffaers
Egg tester.....A. Blum et al
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Electric devices. Starting means for gas or vapor.....S. E. Flichter
Electric devices. Starting system for gas or vapor.....S. E. Flichter
Electric elevator.....E. H. Vogel
Electric meter.....A. Peloux
Electric motor controller.....reissue
Electric motors. Operating and controlling.....N. W. Storer
Electric time switch.....C. G. Nylander
Electrical apparatus. Alternating current.....C. F. Scott
Electrical machine brush holder.....R. Siegfried
Electrical machine coil retaining means.....I. De Kaiser
Electrical transformer controller.....G. E. Gaiffe
Electromagnet.....W. W. Brown
End supporting bracket.....J. R. Fleming
Engine mechanism. Reversing.....W. W. Leach
Engines. Means for supplying liquid fuel to explosive.....P. Murray
Engines. Safety controlling gear for fluid pressure.....E. Crowe
Engines. Safety mechanism for starting explosive.....J. D. Maxwell
Envelope.....A. L. Foy
Evaporating apparatus.....J. A. Just
Evaporating liquids.....J. A. Just
Evaporator. Porous.....D. W. Daley
Explosive engines. Two cycle CR Daellenbach
Eyeglasses.....W. W. Dow
Facial wrinkles. Device for eradicating.....W. B. Hargrave
Farm gate.....O. S. Hendricks
Feed trough.....C. Johnson
Feeding machine and printing press controlling mechanism.....T. C. Dexter
Fence tool.....I. Stripe
Fence. Wire.....S. G. Shaw
Fiber strip.....I. H. Goodman
Filter. Pressure.....G. W. Gerlach
Filter strainer.....J. M. Davidson
Fire alarm system. Automatic.....J. C. Howe
Fire extinguishers. Means for holding acid bottles in hand.....G. H. Downing
Firearm. Recoil operated.....R. H. Kjellman
Fireproof theater.....J. Scully
Fishing bait. Artificial.....W. A. Hardy
Fishing device.....M. F. Mangelsdorff
Fishing reel.....W. Carter
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Flag case and pole.....G. I. Herrick
Flea trap.....F. C. Esmonin
Flue cleaner.....J. McComb
Folding box.....J. H. Fowler
Form Dress.....O. Borchert
Fruit jar.....E. J. Yearly
Fruit processing device.....C. F. Fleming
Fuel. Artificial.....A. M. Thomas
Fur garment.....L. Geschickter
Furniture.....C. L. Ruehs
Gage.....H. S. Gardiner
Garment.....S. J. Kempin
Garment.....J. A. Scriven
Garment gage and marker.....A. R. Waterman
Garment hanger.....J. T. Batts
Gas burner.....C. E. Harris
Gas burner.....G. Imbert
Gas burner.....W. C. Oberwalder
Gas meter.....X. Wittmer
Gear. Change speed.....W. L. Marr
Gear. Speed changing and reversing.....J. J. A. Dischinger
Gear. Variable speed.....A. C. F. Dann
Gearing. Chain and sprocket.....J. M. Dodge
Gearing. Variable speed.....W. B. McLachlan
Glass blowing machinery.....W. F. Altenbaugh et al
Glass decoration with flat surface.....T. Ott
Glass making apparatus. Sheet.....W. B. Fenn
Glass making machine. Cut.....C. B. Bishop
Glaziers' points. Die press for making.....D. M. Humiston
Grading and scraping machine.....D. C. Maytag
Grading machine.....F. Belanger
Graduate.....O. C. Carr
Grain distributor.....A. Witterich
Granulator. Gaged.....E. Hermann
Grinding and polishing machine.....W. V. Robinson
Grinding machine.....W. V. Robinson
Grinding or polishing tool.....N. W. Fletcher
Gun. Air.....W. J. Burrows
Hand glass or similar toilet article.....L. Van Gale
Hanging machine. Burlesque.....J. J. Duffie
Hansom cab front light.....P. Forder
Harrow.....L. B. Jones et al
Harvester.....W. N. Whitely
Harvester, & Corn.....2 pats.....E. K. Rea
Harvester. Corn.....A. L. Brandt
Harvesting machine.....E. A. Peck
Hasp lock.....A. T. Kingsley
Hat, & ventilator.....J. P. Martin
Hay tedder.....O. B. Reynolds
Heating and ventilating apparatus.....E. Glantzberg
Heating apparatus. Air.....F. T. Brenner
Hinge. Combined spring and lock W. F. Bading
Holdback and shaft protector.....J. B. French
Hopple.....J. L. Boone
Horseshoe.....E. Griffiths
Horseshoe.....J. H. Heiman
Hose coupling.....L. B. Colin
Hose coupling.....S. J. McDonald
Hose rack.....H. J. M. Howard

Hub. Wheel.....J. A. Gould
Husking roll.....H. L. Ferris
Hydraulic press.....E. Crowe
Incandescent mantle.....R. J. A. D'Heureuse
Indigo. Purifying.....P. E. Oberreit
Injecting apparatus.....J. S. George
Insulated rail joint.....G. A. Weber
Insulating electrical apparatus. Means for.....E. D. Priest
Insulation. Transformer.....O. B. Moore
Internal combustion engine.....B. M. Aslakson
Iron. Treating.....J. W. Arnold
Ironing board.....E. Lanouette
Kettle.....L. J. Alvord
Keyboard playing attachment.....E. S. Votey
Key mechanism for key actuated instruments.....W. G. Spiegel
Knitting machines. Device for engaging transfer quills and needles of circular.....H. A. Houseman
Knitting machines. Lace pattern mechanism for straight.....J. E. Pike
Lacing.....2 pats.....H. H. Cummings
Ladder.....A. A. Barless
Ladder. Step.....W. C. King
Lamp guard. Incandescent C. W. Eisenmann
Lamp socket. Incandescent.....N. Marshall
Latch.....W. Petersen
Lathing weaving machine. Sheet I. D. O'Brien
Leers or annealing furnaces. Ware feeding apparatus for.....H. H. Bridgewater et al
Lens axis finder.....L. L. Mincer
Level and plumb.....W. Potter
Life saving appliance.....J. M. Decker
Lifting apparatus.....E. H. Vogel
Lifting jack.....J. R. Best
Line holder.....J. P. McPherson
Liquids. Mechanism for regulating the admission of air to.....F. Brogniez
Loom fabric smoothing attachment.....E. Goldsmith
Loom warp stop motion.....P. V. Laboute et al
Loom. Weft replenishing.....W. H. Baker
Lubricating device.....J. E. Gill
Lubricator.....C. J. Jacobson
Mail pouch attachment.....W. D. Miller
Malt kiln.....P. G. Toepfer
Maps, charts, &c. Apparatus for displaying.....M. Flachsbart
Measure. Tailor's.....E. Wakefield
Measuring implement. Mechanic's combination.....C. R. Williams
Measuring instrument. Reflection.....E. Kosinski
Medical battery.....G. F. Webb
Medicated belt. Hygienic.....T. O. Gasaway et al
Mercerizing apparatus.....I. E. Palmer
Metatolysenicarbazied.....J. Callen
Micrometer gage.....G. H. Reoch
Milling machine.....C. E. Van Norman
Mine door opening or closing apparatus.....F. Hutter
Mining machine.....F. M. Lechner
Molder's flask support.....J. C. Bradley
Molding machine.....F. F. Wilson
Motor controller.....H. H. Cutler
Mowing machine.....O. C. Crandal
Music holder.....A. Meyer et al
Music roll spools and flanges. Means for securing.....W. S. Pain
Music sheet driving device.....H. Meyer
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Nut lock.....J. McComb
Oar. Bow facing.....A. Bernier
Oil burner.....J. F. Schreyer
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Packing for piston rods, &c.....J. P. Gundlach
Packing ring. Piston.....W. M. Fletcher
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Palette and attachments. Artist's.....T. S. Fox
Paper feeder.....J. A. Keyes
Paper holder.....G. Arents, Jr
Paper, &c. Machine for coating.....L. W. Noyes
Paper. Manufacturing honeycomb.....D. Budwig
Paper package. Toilet.....A. H. Scott
Paper serving fixture. Toilet.....C. E. McGowan
Paper tube rolling machine.....H. L. Hurd
Pastry tester.....L. F. Ferrell
Pianos. Tune sheet attachment for autopenumatic.....A. Hobart
Pick.....G. Tippet
Picture apparatus. Moving.....G. L. Jenkins
Picture exhibiting device.....G. L. Jenkins
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Pictures. Producing.....M. M. Fields
Pill safe. Pocket.....J. W. Acker
Pillow, cushion, &c.....J. H. Sperry
Pipe jack.....V. Kohout
Pipe joint and forming same.....T. H. Milson
Pipe joint. Compensating.....L. Hochstein
Pipe joints. Construction of.....T. H. Milson
Pipe wrench.....C. F. Leavitt
Plant support.....H. Thaden
Planter attachment. Wireless corn.....F. R. Bergfield
Planter. Check row.....A. L. Perkins
Plating. Nickel.....J. W. Aylsworth
Plow and chopper combined. Cultivating.....T. Smith
Pocket knife.....E. Kaufman
Policemen's club.....J. A. Wade
Post.....A. D. Benham
Potato digger.....H. E. Lord
Potato digging machine.....C. J. Moulton
Printing apparatus. Blue.....J. H. Wagenhorst
Printing apparatus. Yarn.....W. Shaw
Printing plate overlay and making same Half-tone.....J. E. Gilbert
Printing type. Apparatus for molding and casting.....P. J. Lamp'l
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Pump or motor. Rotary.....C. M. Manley
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Pumping apparatus.....G. J. Murdock
Puncture closer.....R. W. Sampson
Puzzle.....M. N. Strickland
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Rail joint.....W. D. Williams
Rail joint fastening.....W. T. Brown et al
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Railway block signal system.....R. Tomlinson
Railway crossing appliance.....W. J. Bell

Railway crossing signal.....W. J. Bell
Railway frog.....D. F. Vaughan
Railway or tramway points, &c. Shunting lever or device for operating.....W. Taylor
Railway safety appliance.....J. H. Finley
Railway switch.....M. M. Fitzgerald
Railway tie.....L. G. & A. O. Dailey
Railway tie. Metal.....R. H. Stevens
Railway vehicles. Controlling apparatus for electrically propelled.....B. G. Lamme
Ratchet drill.....L. M. Cooper
Reamer.....C. A. Ast
Reel.....C. P. Searles
Refining engine.....J. H. Annandale
Refining furnace.....R. Robinson
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Rein holder.....D. C. Scott
Reversing mechanism.....C. F. Smith
Ribbon holder.....A. H. Gardyne
Rods or wire. Apparatus for handling coiled bundles of.....J. R. George
Rubber. Apparatus for treating raw.....J. R. C. Danin
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Rule gage.....H. McKechnie
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Saddle. Side.....J. Barlow
Safety device.....F. B. Corey
Sap spout and cover.....J. H. Grimm
Sash hanger.....N. H. Campbell
Sash lock and lift.....O. A. Essig
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Screw driver.....G. E. Wood
Screw making machine.....A. M. Stillman
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Sewing machine. Buttonhole.....A. Feude
Sewing machine. Fur.....C. E. Hadley
Sewing machine plaiting attachment.....O. Rickenmann
Sewing machine presser foot.....I. R. Hann
Sewing machine thread cutting and clamping mechanism.....A. Feude
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Shaft support. Vehicle.....H. K. Kimpton
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Signaling device. Audible.....W. J. Bell
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Sled. Bob.....H. L. Ferris
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Trolley harp.....E. R. Warren
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Turbine speed regulator. Steam K. Andersson
Turbines. Forming U-shaped buckets or pockets on the rims of gas or steam.....M. Kaufhold et al
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Type writing machine back spacing attachment.....W. A. Parker
Umbrella.....R. C. & J. D. King
Umbrella or parasol attachment G. Friedman
Upholstery.....T. W. Busche
Valve.....E. Schmidt
Valve. Elastic fluid compressor.....J. C. Kilton
Valve. Gate cock.....J. R. Treen
Valve. Gate.....C. E. Huxley
Valve mechanism for air compressors or the like.....A. W. & Z. W. Daw
Valve mechanism. Pressure regulating.....A. W. Schramm
Vegetable hair. Machine for making.....W. Hanson
Vehicle boot.....2 pats.....H. C. Martell
Vehicle. Motor.....W. W. Robinson
Vehicle top tilting attachment D. W. Leonard
Vending machine. Coin controlled.....W. B. Bartram
View outfit.....R. R. Whiting
Washboiler attachment.....H. O. Turner et al
Water closet seat attachment W. C. Trevering
Water heater.....A. D. Gordon
Water heating apparatus.....P. Deasy
Water heating apparatus.....P. A. Deasy
Water purifying apparatus.....H. H. Sutro
Water tube boiler.....C. L. Seabury
Wheel.....C. Heart
Wheeljack. Suspended.....C. Haeske
Window cleaner.....H. A. Hayden
Window screen.....G. Du Temple
Window screen.....F. B. Howe
Window weight.....J. M. Wishart
Wire reel for machines for inserting fastenings.....L. A. Casgrain
Wire stretcher.....M. Tunbunll
Wire stretcher and slicer.....G. F. Movers
Wires together. Locking.....S. G. Shaw
Wrapping machine.....A. Shedlock
Wrapping machine.....W. B. Page et al
Wrapping machine.....F. C. Waldron
Wrench.....A. G. Ely
Wrench.....R. Nolen
Wrench construction.....D. Booker
X-ray tube shade.....R. Friedlander

DESIGNS.

Badge.....I. F. Thomas
Hose rack member.....T. V. Forster
Mirrors, brushes, or similar toilet articles. Back for.....W. H. Berry
Mirrors or similar articles. Back for hand.....S. A. Keller
Oil cloth.....4 pats.....A. B. Buchanan
Stove.....F. J. Frey et al

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MECHANICAL PATENTS.

Acid. Apparatus for making sulfuric.....H. Hegeler et al
Adding machine.....E. Fitch
Aerator. Cream or milk.....G. W. Kennedy
Air brake system.....W. Williams
Air compressor.....J. S. Herriot
Air current governor.....S. P. Smith
Air ship.....reissue.....J. Berry
Alarm for pneumatic feeders.....T. J. Arnault
Alloy and its manufacture.....R. B. Wheatley
Ammunition hoist.....J. F. Metten
Anchor.....W. D. Carson
Animal trap.....F. H. Crago
Annulus.....L. N. D. Williams
Apparel hanger.....C. Easton
Axle. Wagon.....D. Jackson
Baby walker or perambulator.....R. K. Blake
Balance escapement.....H. Reddohl
Bale tie.....C. Kitchin
Ballot box.....L. D. Woodruff
Bandage rest.....W. S. Hubbard
Barrel head.....V. T. Sweeney
Basket making machine.....E. Horton
Bath or basin waste apparatus W. Bunting, Jr
Baths. Preparing a composition for sulfur.....W. Matzka
Bearing. Shaft.....F. Ray
Bed, lounge, crib, &c. Combination.....J. Schwartzman
Reet topping machine.....L. L. Wilson
Belt.....G. A. Cutter
Belt brushing apparatus. Conveyer.....C. K. Baldwin
Blocking and cultivating machine.....T. McEwing
Boiler furnace. Steam.....G. Kimball
Boiler tube cleaner.....H. C. Ryding
Bolting or sifting machine.....A. Klein
Boot or shoe.....W. Croner
Boring and reaming tool.....B. Brownstein
Bottle filling machine.....E. H. Kreider
Bottle. Non refillable.....W. F. Puffert et al
Bottle. Non refillable.....J. Whitelaw
Bottle packing device.....J. T. Craw
Bottle stopper.....T. J. Lamping
Bottle stopper.....D. W. Divine
Bottle stoppering machines. Feeder connecting collar mechanism for.....F. O. Woodland
Bottles, jars, &c. Stoppering.....F. W. Margetts
Brake.....F. A. Rundle
Brick making machine.....E. R. Sutcliffe
Brick making machine mold.....E. R. Sutcliffe
Briquetting machine.....I. J. Jones
Broom.....S. Tuttle et al

- Buckle..... J. C. Rosenkranz
Buckle locking device..... J. H. Spaulding
Bundle carrier and shocker..... O. Schneider
Burial case..... P. D. Skahan
Burner..... A. McLeod
Button..... L. Votrubeck
Button, Collar..... G. A. Spaeth
Button making machine N., Jr., & P. J. Barry
Buttonhole stitching and cutting device..... C. P. Watson
Buttonhole stitching machine..... E. B. Allen
Cable support..... J. K. Gano
Calculating machine..... H. E. Goldberg
Camera support, Photographic A. Mercier, Son
Cap, Retaining vessel..... C. C. Woods
Car body stake..... A. Lipschutz
Car bumper..... E. Moran
Car coupling..... E. H. Janney
Car dump..... E. Moran
Car fender..... F. E. Caton
Car puller, Locomotive..... W. E. Hamilton
Car side bearing, Street..... J. E. Norwood
Car, Temperable shipping..... J. E. Fugazzi
Car track sander, Motor..... W. Lintern
Car unloader..... F. W. Lovell
Cars, Apparatus for handling mine..... W. J. Patterson
Carriage..... W. B. Morrey
Carriage change speed gear, Motor E. Mathieu
Case hardening..... C. Lamargese
Cash register..... J. H. McCormick
Cash register..... C. Carroll
Cash register locking device..... C. C. Spengler
Caster, Bedstead, &c..... A. B. Sheffield
Cattle guard..... H. Hamel
Cement pipe making apparatus..... F. M. Rozier
Cement to stock, Machine for applying..... G. L. Rollins
Chain, Conveyer..... D. E. Phillips
Chair molding machine..... C. Mills
Change maker..... C. C. Spengler
Chart, Dress..... J. Ulrich
Checkrein attachment..... W. M. Wright
Cheese hoop..... J. R. Meyers
Cheese mold or hoop..... J. R. Meyers
Churn..... C. C. Pullen
Cigar heading device..... O. Hammerstein
Cigar holder..... M. H. Pigou
Cigarette tube making machine..... J. C. Hansen-Ellehammer
Clasp..... L. H. Rossuck
Clasp or fastener..... H. J. Gaisman
Cloth pressing machine, Rotary G. W. Voelker
Cloth winding machine..... C. W. Brown
Clothes drier..... B. C. Steffens
Clutch..... C. Pedersen
Coin counting machine..... C. C. Lindblad
Collar, Dog..... F. H. Erb, Jr.
Colter, Plow..... J. B. Hamilton
Comb cleaner..... L. Casper
Compressor..... I. Carlier
Conductor hanger, Overhead..... S. H. Cochran et al
Container..... J. R. Harbeck
Conveyer apparatus, Belt..... J. B. Humphreys
Copy holder..... R. W. Brooks
Cork or stopper fastener and extractor, Combination..... L. W. Hart et al
Corn husker and shredder..... L. Dornton
Corn shock loader..... J. B. Schuman
Cotton chopper..... J. J. & T. W. Dunaway
Cotton condenser..... E. D. Carter
Cotton gin feeder..... E. Matthis
Cotton press..... J. T. Fuller
Cover, Pot or kettle..... R. A. Sanders
Crate or basket..... E. Mayette
Crutch or cane foot..... J. W. Morris et al
Curler, Hair..... S. A. Spangenberg
Current regulator..... J. J. Wood
Curtain pole..... J. W. Seibert
Curve cutting machine..... F. W. Starr
Cuspidor..... K. Stastka
Cut off for conductor pipes, Automatic..... F. F. Howard
Cut off for fluids under pressure, Automatic..... M. M. Zellers
Cycle..... L. Zelenka
Dam..... N. F. Ambursen
Damper for heaters, Electrically controlled..... F. J. Sprague
Dental clamp..... H. M. Carroll
Dental impression cup..... C. L. Gibbs
Dilator..... W. A. K. Campbell
Door, Cellar..... J. R. Potts
Door hanger..... J. F. Sydon
Door securer..... E. Beseler
Double helical spur wheel..... C. Wust Kunz
Draft equalizer..... E. J. D. Miller
Draft producing apparatus..... W. Fredericks
Draft rigging mechanism..... G. H. Forsyth
Drain trap..... J. C. Stewart et al
Drawer pull..... H. F. Keil
Drawer pull..... I. J. Turner
Dry kiln track supporting post..... J. I. Ott
Drying apparatus..... M. Hecking
Drilling machine..... E. Christman
Drive head..... C. R. Thomas
Driving and speed regulating device, Friction..... C. L. Weichelt
Dyeing apparatus..... S. W. Cramer
Eaves trough clamp..... E. T. Wildsmith
Electrical conductors, Device for removing sleet, ice, &c., from..... D. D. Miles
Electrical quick return system..... R. H. Stevens et al
Elevator..... 2 pats. J. Rice
Embroidery silk holder..... I. L. Thomas
Engine starting attachment, Explosive..... H. M. Rawl et al
Engines, Means for feeding the induction ports or fuel inlets of internal combustion..... F. L. Chamberlin
Engraving machine..... A. E. Francis
Envelop, Return ticket voucher, C. J. Swank
Eraser, Mechanical..... R. T. Merrill
Excelsior machine..... G. P. Lyon
Exercising device..... W. H. Chellis et al
Explosive engine..... F. L. Chamberlin
Explosive motor, Rotary..... J. F. Hathaway
Eyeglasses..... V. Bertolini
Fabrics with gobelin like embroidery designs, Providing woven..... J. L. G. Witte
Facet cutting machine..... F. Stansfield
Feed device, Automatic..... G. H. Preston
Fence..... J. A. Graham
Fiber pulling machine..... F. Wilkinson
File cabinet..... E. M. Lundholm
Filtering apparatus, Slime..... G. S. Duncan
Fire escape..... F. S. Oliver
Fire escape..... T. M. Crowe
Fire extinguisher, Automatic..... J. Butcher
Fishing tackle case..... C. R. Hoag
Floor thimble..... J. H. Zetty
Fluid pressure regulator..... A. L. Merrill
Flushing or syringing, Means for facilitating internal..... J. D. Sourwine
Fly screen..... C. N. Friz
Flying machine..... S. M. Craig
Folding seat..... A. E. Brockett
Folding seat or settee..... H. D. Warner
Food products, Treating..... P. Heyde et al
Forceps, Spring..... J. Muller
Furnace flue dust into blocks, Converting..... S. V. Peppel
Furnaces, Valve mechanism for gas burning..... H. R. Palmer
Furniture, School..... W. Collins
Fuse, Percussion..... A. T. Dawson et al
Game table, Convertible..... N. B. Stone
Garment, Nether..... M. C. Kester
Garment supporter clasp..... G. W. Traut
Gas distributing systems, Steadying device for..... G. R. Ibach et al
Gas producers for internal combustion motors, Starting..... H. Neumann
Gas retort charging apparatus..... G. A. Brondor
Gear, Speed reducing..... E. Nelson
Gearing..... H. W. Loudon, Sr.
Glass beveling machine..... P. E. Welton
Governor, Engine..... C. E. Terrell
Grain drier..... F. M. Smith
Grain separator and cleaner..... I. M. Cooper
Granular material drier, E. L. Merriman et al
Hair drier..... S. Hudson
Hame fastener..... S. T. Marlette
Hauler..... H. F. Keil
Harness hook..... H. M. Eldridge
Harrow, Disk..... H. M. Cooley
Harrow sulky..... N. Kiner
Harvester anti side draft attachment..... J. C. Kuyper
Harvesting machine, Beet..... L. L. Wilson
Hasp lock..... A. T. Kingsley
Hawse pipe..... G. A. Nowland
Headlight operating device..... G. F. Chapman
Heater..... C. A. Cribbs
Heater and garbage burner..... G. W. Mathews
Hide working machine..... J. Straiton
Hinge, Furniture..... J. H. Stiggleman
Horse detacher..... A. A. Briggs
Horseshoe..... J. E. Hoffman
Hose supporter..... C. W. Thompson
Hot air furnace..... W. H. Tippit
Ice cutting machine..... R. Mowery
Incandescent mantle burner igniting device..... H. C. Thomson
Indigo, Manufacture of brominated..... A. Schmidt et al
Insect catching and plant spraying machine..... H. J. Noll
Insect destroying apparatus..... A. L. Jones
Insects from plants or the like, Machine for removing..... J. W. Bussell
Internal combustion engine..... O. P. Ostergren
Kettle attachment..... J. E. Schneider
Key ring..... L. Siersdorfer
Knife..... G. C. Palmer
Knitted fabric..... C. J. Sibbald
Knitting machine, reissue..... D. F. Sullivan
Knitting machine dial adjustment..... L. C. Huse
Labeling machine..... H. Hauck
Labeling machine..... J. G. Hendrickson et al
Lacing tie hook setting machine..... I. F. Peck
Ladder and ironing board, Combined step..... J. B. Rohrer
Lamp burner and chimney..... W. H. Margetts
Lamp or lantern, Tubular..... C. L. Betts
Lamp shade and reflector..... T. Smith
Lamp shade holder, Incandescent..... R. W. Schmelz
Lantern attachment, Vehicle..... F. M. & G. Fisher
Lathing, Metallic..... J. R. Evans
Laundry tongs..... S. R. Nettleton
Lead, Treating the residue resulting from manufacture of..... J. W. F. T. & M. Bailey
Leather, Enameled or patent..... W. R. Smith
Ledger, Loose leaf..... A. E. Anderson
Legging..... M. Rose
Lens..... H. Harting
Level..... D. Ricono
Level, Plumb..... F. E. Kreats
Leveling instrument..... H. K. Akins
Lifter..... L. P. Normandin
Liquid delivering and measuring device..... F. Christen
Liquids organically contaminated, Apparatus for testing..... W. D. Scott-Moncrieff
Loading device..... J. P. Foster
Loading machine..... W. E. Hamilton
Lock or latch compensating hub..... H. G. Voight
Locomotive, Water..... F. Kirchbach
Loom beam friction let off..... W. I. Whitehurst
Loom, Filling replenishing..... A. M. Marcoux
Loom shed forming mechanism..... H. F. Kingele
Loom shuttle changing mechanism..... G. Schwabe
Loom thread cutting temple..... E. S. Stimpson
Loom underpick motion..... J. S. Ainley et al
Lumber drier bunk or truck..... J. I. Ott
Macadam, Apparatus for the preparation of tar..... E. P. Hooley
Mail delivery box..... J. A. Barclay
Mail delivery index case equipment..... J. W. Howard et al
Manure loading device..... J. Albrecht
Massage apparatus..... W. Miner
Match box..... R. Parkhouse
Match box..... F. C. Anderson
Mattress..... S. L. Stratton
Measure, Tailor's..... P. O. Hirsch
Measuring machine, Chocolate..... R. T. Hooton et al
Metal billets, &c., Conical rolls for piercing, expanding, or cross rolling..... J. H. Nicholson
Metal shearing machine..... A. A. Berghof
Microtome..... E. Bausch et al
Milk, Extracting soluble albumen from..... C. Lewis
Mining machine water recovering appliance, Placer..... S. B. White
Mining quib..... J. R. Powell
Mirror..... H. Berry
Motion converting device..... E. S. Morton
Motor control system..... A. C. Eastwood
Moving platform..... A. Francovich
Muffle..... J. C. Fox
Muffler, Exhaust..... W. J. Perkins
Music chart..... W. M. Reese
Music instruction device..... K. Burrows
Musical instrument..... F. H. Fairchild
Name plate holder for drawer pulls, &c..... H. F. Kell
Napkin holder..... D. G. McClay
Nipple holder..... W. Shaw
Note register..... J. B. Winn
Numbering machine..... E. G. Bates
Nut lock..... W. Pickard
Oil, Making a substitute for cod liver..... K. F. Tollner
Onion topping machine..... W. D. Haskell
Ordnance, Breech loading..... C. W. Bartholmes
Ore pulp washer and concentrator..... F. E. Parker
Ore roasting and oxidizing apparatus..... L. H. Allen
Ore roasting furnace 2 pats..... G. H. Shellabarger
Ore washer and separator..... S. B. Wise
Oroscope..... P. T. Geyerman
Package..... E. F. Price
Packing, Metallic rod..... W. Kollermeier
Paper, &c., Feeder for sheets of..... T. & S. Emerson
Pedometer..... W. E. Porter
Phonograph..... A. N. Petit
Piano frame, Grand..... L. Oor
Pipe joint..... H. C. Weeden
Placer machine, Dry..... J. J. Callahan
Plow..... G. A. Kelly
Pole tip..... W. Ainlay
Powder and making same, Smokeless gun..... W. H. Simpson
Press..... M. P. Mahar
Printing machine, Electric..... G. S. Gallagher
Printing machine, Tobacco tag..... W. E. Martin
Pulp screen apparatus..... Z. Lovejoy
Pump, Centrifugal..... N. K. F. Hanson
Pump, Multistage centrifugal, turbine, or similar..... F. Ray
Pump or lubricator, Oil..... W. Q. Pfahler
Pump steam head, Air..... J. C. Lyons
Pumping apparatus..... A. C. E. Rayson
Punch..... W. A. Bernard
Punching machine..... D. D. Frothingham
Puzzle..... S. L. Saunders
Rail joint..... C. F. Hall
Rail joint bridge, Portable..... C. W. Coburn
Railway..... A. J. Smithson
Railway connecting plates, Machine for burring..... R. B. Charlton
Railway, Gravity..... B. B. Floyd
Railway rail, Street..... W. Bertling
Railway side line sod cutter..... F. W. Gideon
Railway switch..... R. S. Sheeley
Railway track structure..... G. M. Ervin
Railway track structure plate fastening..... G. M. Ervin
Railway vehicles, Method of and means for applying or retracting brakes of..... F. W. Gasnier
Ratchet wrench..... H. E. Baker
Ratchet wrench..... C. J. Coulter
Razor, Safety..... D. W. Gage
Reflector burnishing machine..... A. Carter
Refrigerator tube holding machine..... A. B. Kokernot
Rivet making machine..... C. W. Richards
Roasting pan and skeleton support, Combined..... L. Reinhard
Roof flashing for vent pipes..... J. Bropson
Rope drum engine..... H. N. Covell
Rotary engine..... W. Wyand
Rotatable wheel with backward brake, Freely..... J. J. Weller
Roundabout..... J. Armitage
Rubber compound..... W. F. Hogan
Rule for steel beams, Architect's slide..... B. E. Winslow
Running gear..... W. H. Birdsall
Safety pin..... C. B. Taylor
Sash fastener..... S. F. Albright
Sausage stuffer..... H. W. Loudon, Sr.
Saw..... G. M. Tilden
Sawing apparatus..... E. E. Frank
Scale, Automatic weighing 2 pats..... H. Hager
Scale, Spring..... L. B. Galorbeau
Seal, Car, &c..... L. J. Campbell
Secondary battery..... O. H. F. C. Walter
Seed gatherer..... J. Hall
Seeding machine..... W. M. Gibbs
Separator and cleaner..... C. F. Hettinger
Serum holder..... F. K. Stearns
Service cup..... A. W. Beers
Sewing machine presser foot mechanism..... C. Pedersen
Sewing machine presser foot mechanism..... G. J. Dormandy
Sewing machine, Revolving hook..... P. Anschutz
Sewing machine tension..... C. Pedersen
Sewing machine tucker..... P. T. Smith
Shackle hook..... W. Robson
Shade holding device..... E. T. Burrows
Shaft coupling..... L. Lehman
Shaft for quicksand or other dangerous ground, Safety..... R. Baggeley
Sharpener, Disk or colter..... G. D. Denio
Shelf rest..... H. F. Kell
Shoe tree..... E. White
Shoe upper..... F. O. Beaudry
Shunt..... J. Harris
Signal system, Electric..... J. H. Harrell
Signature gathering machine..... B. Kerscher
Silo..... E. Hillard
Skirt fastener..... V. W. Mills
Sled runner attachment..... G. S. Fray
Slop hopper, floor drain, and backwater trap, Combined..... C. W. O'Neill
Smelting compounds and producing carbids..... W. S. Horry
Snap hook..... C. J. Carlson
Spectacle or eyeglass support..... W. S. Boyd, 3d
Speed device, Variable..... H. E. Kellogg
Speed regulator for hydraulic presses..... R. Wenzelides
Speed transmission mechanism Variable..... W. C. Bucknam
Speedometer..... J. W. Jones
Spinning machine roller stopping mechanism..... J. Harrison
Spinning, twisting, winding or like machines, Mechanism for driving flier or like spindles of..... J. Boyd
Spool machine..... A. J. Thornley
Spoon forming mechanism..... F. W. Otis
Spring dampener, Frictional..... E. Denegre
Spring seat..... J. J. Wisda
Stamp shoe or die..... W. Brinton
Stapling machine feeding mechanism..... F. Balze
Stay tipping machine..... O. Kraus
Steam engine..... P. Thornley
Steel, Manufacture of cast..... M. Meslans
Steel, Treating and recarburizing scraps..... 2 pats. H. B. Atha
Steering mechanism, Manually operated..... F. T. Cable
Streotype plates for printing purposes, Producing..... C. B. Herrmann
Stocking or hose supporter..... C. R. Bannier
Stove burner, Gas..... J. Johnson
Stove, Oil..... E. A. Anderson
Stuffing box..... G. E. Albrand
Supporting device..... A. M. Cox
Surfacing wheel..... C. G. Warner
Surgical bridge..... J. F. Ruckel
Swaging tool..... 2 pats. M. O. Felker
Swing..... C. T. Campbell
Switch..... H. A. Lewis et al
Syringe, Vaginal..... H. T. Foote
Talking machine sound box..... J. C. English
Tap, Adjustable collapsing..... H. H. Russell
Taps to drums, &c., Means for attaching draw off..... A. M. S. Watts
Targets on rifle ranges, Means for operating..... T. Murray
Telegraph system receiving instrument, Printing..... W. R. Landfear
Telephone exchange system..... J. P. Downs
Telephone repeater..... D. H. Wilson
Telephone system auxiliary apparatus..... W. W. Dean
Therapeutic purposes, Apparatus for producing gyratory magnetic lines of force for..... R. Trub
Thread take off..... C. Pedersen
Thresher and cleaner, Cotton..... F. A. Blain
Threshing machine separating device..... R. Davies
Tire clamp..... P. F. Schaffer
Tire, Double tube pneumatic..... A. H. Marks
Tire, Spring..... L. Herz
Tire upsetting machine..... W. H. Wolfe
Tongue switch..... E. B. Entwistle
Tongue switch..... G. M. Ervin
Tongue switch..... P. Lavelle
Tool, Combination..... S. P. Watt
Tool holder..... J. R. Gilerest
Torpedo safety device, Automobile..... G. E. Edgar
Toy air gun..... G. Horton
Toy, Electrical..... J. Kelly
Toy gun..... R. M. Painter
Trap..... R. N. Wynne
Trolley..... W. O. Miller
Trolley..... J. M. Olinger
Trolley wire clip..... A. E. Holaday
Truck, Car..... E. Peckham
Trunk harness..... D. W. King, Jr.
Tubes, &c., Manufacture of..... B. F. McTeer
Tubular boiler..... C. Bioly
Turbine..... G. M. Andersson
Turbine..... I. Benjamins
Turbine, Steam..... M. D. Kalbach
Type casting and setting machine..... G. A. Goodson
Type casting and setting machine..... J. C. Fowler
Type writer actuating mechanism..... W. G. Spiegel
Type writer attachment..... J. A. G. Arnold
Type writer copy holder..... D. M. Sells
Type writing machine actuating mechanism, Electromagnetic..... E. K. Curtis
Type writing machine carriage feeding mechanism..... J. A. Smith
Valve..... P. R. Mattocks et al
Valve device..... C. H. Watters
Valve piston and connection, Triple, reissue..... A. H. Gelt et al
Valve, Puppet..... H. Dock
Valve, Means for operating pneumatic..... W. Lintern
Vapor generator..... J. Stubbers
Vehicle curtain..... R. Wall
Vehicle lighting apparatus..... J. A. Little
Ventilator..... F. J. Prochaska
Violin..... J. D. Loppentien
Wagon brake..... J. J. Schofield
Wagon, Dump..... H. C. Tripp
Wall section for house-building, Portable..... E. C. Mahony
Washing machine..... E. G. Ellis
Washing machine..... H. A. Bierley
Watch repairing tool, Combination..... M. W. Sayyidah
Water, Purifying..... W. M. Jewell et al
Water tube boiler..... R. Gray
Weather strip, Metal, 2 pats..... H. E. Kenny
Weeder, Wheel..... S. Fuller
Weighing machine, Automatic..... E. G. Thomas
Weighing mechanism, Automatic..... A. H. Phillips
Whiffletree coupling..... S. J. Davis
Whiffletree hook..... A. K. Otterman
Whip sections, Means for uniting..... M. O. Felker
Whip stock loop connection..... M. O. Felker
Whipping device, Draft animal..... J. Brooner
Whistle, Steam..... I. Anderson et al
Wick, Lamp..... H. G. James
Window..... H. E. Brown
Window..... C. E. Gale
Window..... R. H. Wunder
Window frame and sash..... A. Rasner
Wiring system, House..... J. W. A. Richardson
Worsted preparing and spinning machine..... 5 pats. F. P. Shaw
Woven fabric..... T. B. Dornan
Wrench..... H. E. Bordwell
Wrench..... W. N. Greer

DESIGNS.

Pin, Clasp..... H. W. Fisher
Rubber fabric, Sheet..... D. B. Martin
Spoons, forks, or similar articles, Handle for..... F. Habensack

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MECHANICAL PATENTS.

Addressing machine..... S. E. Farnham
Advertising or picture exhibiting apparatus..... M. L. Frink
Arc extinguishing means..... R. E. Hellmund
Arm rest for books, &c..... A. E. Van Camp
Article of manufacture and making same..... W. S. Bucklin
Astronomical apparatus..... F. H. Mackenzie
Autographic register..... 4 pats. A. Krauth

Autosled..... C. Crisman
 Baling press..... R. P. White
 Baling press..... H. J. Uhlenkott
 Band brake..... W. N. Dufford
 Bar slitting and stretching machine..... J. F. Golding
 Barrel, &c., closure..... C. R. Westling
 Bath tub seat and toilet stand, Combined..... E. T. Brown
 Batteries, Apparatus for washing storage..... J. P. Lough
 Bearing, Self-oiling..... F. Hachmann
 Bed, Camp..... G. A. Caproni
 Bed, Crib..... W. S. Foster
 Bed, Folding..... S. J. Herrick
 Bedpost..... G. Shuman
 Beer under pressure, Carrying through the fermentation of bottom fermented..... V. Lapp
 Belt or apron, Wire..... C. Swinscoe
 Bicycle gearing..... H. F. Maynes
 Billiard registrar, Electric..... P. S. Hotchkiss
 Binder, Loose leaf..... I. Wide
 Boiler alarm..... A. Altmann
 Boiler flue cutting out, expanding, or beading machine..... C. E. Loetzer
 Boiler tube and flue scraper..... C. E. Lloyd
 Book, Card memorandum..... T. Noble
 Book, Pencil..... A. H. Stow
 Boot or shoe cleaner..... W. S. White
 Boot or shoe tread piece..... A. H. Pratt
 Boring machine..... F. C. Zeek
 Bottle, Non refillable..... O. L. Fisher et al
 Bottle, Non refillable..... M. P. Lafitte
 Bottle stopper and dropper..... W. T. Goldsmith
 Bottle stopper removing device..... F. M. Glaessel
 Box tray making machine..... J. C. Donnelly
 Brake beam..... R. P. Lamont
 Brake shoe..... H. Fresh
 Brakes, Pressure retaining device for fluid pressure..... F. Mertsheimer
 Bread, Making..... L. C. Sharpless
 Bridle blind..... H. G. Semmann
 Brush holder..... L. Christiansen
 Brush, Tooth..... C. Heilrath
 Buggy top support..... L. W. Loving
 Building construction..... T. O'Shea
 Bung and connection therefor, Valve..... D. Beebe
 Burner..... J. Heinrichs
 Button..... H. H. Quehl
 Cabinet, Floss..... C. E. Emory
 Cabinet, Kitchen..... L. T. Brenizer
 Calendar, Daily engagement..... W. E. Judge
 Can..... J. E. State
 Can..... G. C. Witt
 Can cleaning machine..... W. Munn
 Can, &c., closure..... C. A. Cheney
 Can filling machine, Multiple..... J. Cuning
 Can opener..... A. D. York
 Can opener..... W. H. Stephenson
 Can opener..... F. R. Pendleton
 Candle holding device..... E. W. Curtiss
 Cap..... C. J. Breck et al
 Car coupling..... J. Snyder et al
 Car coupling..... C. M. Shepherd
 Car door operating and fastening device..... R. J. Scales
 Car door operating and locking device..... F. H. Howe
 Car draft gear, Railway..... D. C. Ross
 Car fender..... F. Csanitz
 Car, Gondola..... G. I. King
 Car hand strap..... J. S. Paxton
 Car or wagon undercarriage, Tram or railway..... P. Herbert
 Car rocker side bearing, Railway..... F. B. Townsend
 Car wheels, Abrading shoe for truing up..... J. M. Griffin
 Card case and counter..... O. A. Sterl
 Carding engine feed..... C. M. Barber
 Carton marking machine..... C. S. Luitwieler
 Cash register..... W. H. Muzzy
 Casket cabinet draw section..... W. Thompson
 Cement or cementitious products, Machine for making..... W. E. Jaques
 Cereal product..... A. P. Anderson
 Chair..... E. H. C. Armstrong
 Check hook..... F. F. Hodges
 Check plumper..... O. L. Mayes
 Chilli roaster..... S. E. Knapp et al
 Chimney cap construction..... J. W. Belcher
 Chimney top..... R. Schlegelmilch
 Chuck, Drill..... C. W. Sargent
 Chuck, Magnetic..... C. W. Sponsel
 Cider mill..... A. C. Burner
 Cigar branding machines, &c., Attachment for..... W. M. Campbell
 Circuit breaker..... G. Wright et al
 Circuit controlling apparatus, Time..... H. C. Little
 Clipping or grooming machine..... A. L. Hale
 Clothes line..... M. S. Cross
 Clutch device..... T. L. & T. J. Sturtevant
 Clutch for lathes, &c..... W. Runge
 Clutch, Friction..... C. Seymour
 Coal feeding apparatus, Pulverulent..... W. F. Wolfe
 Coat, hat, umbrella, &c., rack, Safety..... C. F. Garland
 Coating and lining material for metal objects..... M. Toch
 Cock, Stop..... F. E. Hummel
 Collapsible tube..... J. A. Symonds
 Controller..... F. B. Corey
 Cooky or doughnut cutting device..... F. W. Gardner
 Cooler..... H. Reininger
 Copper, Sampling..... R. Baggaley
 Core spindles, Collapsible..... W. H. Harrison
 Corks simultaneously on both ends and forming them same length, Machine for grinding..... G. H. Vincke
 Corn snapping machine..... J. C. Parson
 Corset, Apparel..... 2 pats..... D. Kops
 Corset attachment..... D. Kops
 Corset stay..... D. Kops
 Cotton gin..... E. R. Barber
 Cranes, derricks, &c., Gearing for..... S. W. Wilt
 Cribs, &c., Closure attachment for..... M. C. Collier
 Currents, Rectifying and interrupting alternating..... W. Scheidel
 Curtain and shade adjuster, Window..... C. Bryan
 Curtain or shade holder..... H. C. Forsyth
 Curtain stretcher..... U. Herbert
 Cuspidor..... E. F. Holland
 Cut out..... F. Buchhop
 Dental articulator..... A. H. Fleming

Dental chair..... F. E. Case
 Dental disk cutter..... J. A. Hallett
 Dental work, Apparatus for shaping metal parts in..... D. N. Booth
 Derrick frame, Shaft hoist..... A. Kloune
 Dial..... A. J. Farmer
 Die cutting machine..... E. Meyers
 Die lifter..... E. B. Hawkins
 Dish..... J. H. Crowell
 Display case..... L. M. Picker et al
 Display curtain holder and repository..... T. J. McElhenie
 Display device..... L. A. de Kernay
 Display package..... J. P. Hummel
 Distillation of crude oils from pine wood..... J. C. Mallonee
 Diving apparatus..... J. von Miniszewski
 Diving suits or apparatus, Means for forcing water from..... E. B. Petrie et al
 Door check..... O. C. Rixson
 Door closing device..... O. C. Rixson
 Door guard, Self locking..... E. H. Doherty
 Door hanger, Sliding..... W. Axman et al
 Door, Warehouse..... 2 pats..... J. Erwood
 Dough, Forming..... C. F. Dietz
 Dough forming machine..... C. F. Dietz
 Draft rigging mechanism..... G. H. Forsyth
 Dress hanger..... S. Hermann
 Dress suit case, hand bag, &c..... S. M. Gordon
 Drill..... J. W. Pickel
 Drilling and tapping machine..... C. C. Newton
 Drilling machine, Multiple..... A. C. Vaulclair
 Drilling machine templet..... A. C. Vaulclair
 Drop attachment, Balanced cord..... 2 pats..... H. D'Olier, Jr
 Drum, Heating..... M. E. Loehr
 Drying apparatus..... L. Gathmann
 Drying house for fish, &c..... H. N. Haug
 Dye and making same, Orange..... O. Sohst
 Electric cells, Producing elements for..... L. Kitsee
 Electric connection rosette..... M. Norden
 Electric current interrupter or circuit breaker, Mechanical..... J. O. Heinze, Jr
 Electric fixture switch attachment, Cluster..... W. L. Bradshaw
 Electric motors, Regulating..... F. E. Case
 Electric time switch..... A. W. Hulchins
 Elevator..... E. C. Northrup
 Elevator or mining cage safety appliance..... W. P. Ward
 Elevator speed controlled safety stop..... H. M. Young
 Engine starting device, Gasoline F. Reynolds
 Engines, Electric sparking plug for gas..... A. Buchner et al
 Envelop opening machine..... J. C. Robertson
 Excavating machine..... C. C. Battey
 Excavating shovel, Automatic..... T. Cox
 Exerciser and developer, Physical A. E. Terry
 Exploding mines, blasting, &c., Apparatus for..... F. L. M. Masury
 Eyeglasses..... G. A. Stiles
 Eyeglasses..... 8 pats..... L. F. Adt
 Eyeglasses or spectacles..... A. D. Bloch
 Fabric, Machine for extracting liquid from..... I. E. Palmer
 Fare box..... F. H. Stuart
 Fatty substances, Separating fluid from solid portions of..... W. B. Kerr
 Faucet..... W. R. Campbell
 Faucet, Soda fountain..... E. J. Calley
 Fence, Portable..... E. C. Stone et al
 Fence post..... J. W. Gibson
 Fence post, Composite..... B. F. Stultz
 Fence wire clamping device..... J. A. Clements
 Fence wires, Fastening..... C. H. Hauson
 Fertilizer discharge controlling mechanism..... W. Fetzer
 Fertilizer distributor..... J. G. Love
 Filing case..... B. Pirosh
 Filter, Feed water..... G. H. Ward
 Finger ring..... J. E. Fitzgerald
 Fire alarm system..... B. P. Ketcham
 Fire door..... F. L. Saino
 Fire extinguisher..... S. Erb et al
 Firearm..... P. O. Elterich
 Firearm, Breech loading..... A. Chuchu
 Firearm, Magazine..... H. Hundrieser
 Fishing gear..... A. W. Wilson
 Fishing tackle..... S. D. Martin
 Flething machine..... F. J. Perkins
 Flexible joint..... H. Austin
 Floor and ceiling support..... E. W. Fenn
 Floor covering protector D. W. Young Jr., et al
 Flue stopper..... G. McAdams
 Flute..... G. Steinert
 Fly screen..... F. P. Knowles
 Friction brake..... G. A. Ensign
 Fruit picker..... H. C. Balch
 Fuel block or briquet..... G. W. Hopp
 Funnel..... H. F. Ganon
 Funnel..... E. Hagenbach
 Furnace..... W. Hentschel
 Furnace..... J. T. Greene
 Furnace gate, Antiradiating..... G. F. Watkins
 Gage and gage clamp..... F. H. Richards
 Game apparatus..... H. U. Downing
 Garment fastener..... F. K. Hatfield
 Garment, shelter tent, and blanket roll covering, Combined..... C. H. Mason
 Gas and air mixing burner..... F. G. Crone
 Gas and coke, Apparatus for the manufacture of..... J. C. H. Stut
 Gas and coke making apparatus..... J. C. H. Stut
 Gas and coke, Manufacturing..... J. C. H. Stut
 Gas burner..... G. Machlet, Jr
 Gas burner, Inverted incandescent H. Ahrendt
 Gas generation apparatus..... W. A. Salisbury
 Gas heater..... G. J. Karle et al
 Gas holder stiffening leg..... H. A. Carpenter
 Gas machine..... C. S. Rogers
 Gas machine, Acetylene..... R. H. Walters
 Gas, Manufacturing..... J. C. H. Stut
 Gas treating apparatus, Fermentation..... J. F. Wittemann
 Gasoline tank safety appliance..... J. Stubbers
 Gear cutting and milling machine F. Hardinge
 Gear locking device..... A. S. Cowan
 Gear wheel..... N. C. Bassett
 Gearing, Differential speed..... H. W. Gardner
 Glass, Apparatus for fire polishing C. J. Nolan
 Glass, Drawing..... J. H. Lubbers
 Glass drawing apparatus..... J. H. Lubbers
 Glass, Fire polishing..... C. J. Nolan
 Glass grinding machine..... H. C. Watson
 Glass machine, Wire..... J. H. Cunliffe et al
 Glass making apparatus, Cylinder J. Haley
 Glass, Manufacturing..... S. O. Richardson, Jr
 Glass shaping machine..... M. J. Owens

Glove stretcher..... C. L. McBride
 Gold saving apparatus..... E. S. Kelley
 Gongs, &c., Operating device for..... A. G. Kent et al
 Governor, Fly ball..... M. Haerberlein
 Grain elevator..... F. Scott
 Grain separator..... W. W. Huntley
 Grain separator, Shaking..... F. M. Smith
 Graphophone attachment..... E. Gilbert
 Graves, Apparatus for signaling from..... E. S. Crosby et al
 Grinding mill, Ear corn..... J. Jorgensen
 Hair springs to time, Apparatus for vibrating..... G. V. Neal
 Handcuff..... H. G. Judd
 Harrow, Wheeled..... H. Cloyd
 Hat fastener..... O. Stromborg
 Hat form retainer..... W. Bowling
 Hay rake, Side delivery..... F. M. Conroy
 Head covering or net..... E. F. Comstock
 Header, Grain..... J. A. Sharp
 Heating and lighting apparatus..... T. G. Smart et al
 Heating system, Greenhouse..... C. C. Peck
 Heel, Elastic cushion..... J. F. B. Litchfield
 Hemmer, tucker and corder, Combined..... L. A. & M. E. Mitchell
 Hide working machine..... D. Glencross
 Hinge and check, Door..... C. E. Treadwell
 Hinge, Spring..... J. Bardsley
 Hopple..... J. T. Coleman
 Horse blanket..... reissue..... O. H. Muntz
 Horse releasing device..... W. E. Bolsta
 Horseshoe calk..... W. L. Goodrich
 Horseshoe holder..... C. Haller
 Horse rack..... M. C. Meehan
 Hose reel..... E. Cliff
 Hose supporter..... A. H. Cohn
 Hose supporter clasp..... J. Lindauer
 Hydraulic motor, Reciprocating J. Gruninger
 Hydrocarbon burner..... W. R. Jeavons
 Hydrocarbon vaporizing apparatus..... C. H. Montgomerie y Agramonte
 Ice chisel and ice chipper, Combined..... A. S. Newby
 Ice tank..... A. Wagner
 Incandescent burner..... B. F. Daly
 Index pin precisionizer..... F. H. Richards
 Initiation apparatus..... P. F. Habershtick
 Insulated hanger, Arc lamp..... H. G. Pfeister
 Ironing board..... C. H. Williams
 Ironing board..... L. J. Cooper
 Ironing table, Shirt..... L. J. Cooper
 Journal bearing, Antifriction..... F. C. Mason
 Kettle, Steam heated tipping..... P. Gruener
 Key fastener..... E. F. Henderson
 Knitting machine stop motion..... 2 pats..... F. Wilcomb
 Lace tip, Shoe..... A. Potvin
 Ladder, Step..... O. Richardson
 Ladder, Step and extension..... A. Hartzler
 Lamp..... J. P. King
 Lamp, Electric arc..... A. S. Deem
 Lamp, Hydrocarbon incandescent..... W. S. Prosky
 Lamp, Inclosed arc..... 2 pats..... O. N. Wisweil
 Lamp tubulating machine, Incandescent..... W. R. Burrows
 Lamp, Vapor..... A. Glover
 Lamps, Manufacture of incandescent electric..... H. Horge et al
 Latch..... F. B. Williams
 Lath carriage turret attachment J. H. Blair
 Leather piece marker, Upper C. S. Luitwieler
 Leg and support, Removable..... J. E. Knight
 Lens grinding machine..... W. G. Wolfe
 Limb, Artificial..... A. Gault
 Lime and sediment extractor..... H. White
 Liquid separator bowls, Means for yieldingly supporting centrifugal..... F. Jebson
 Liquids, Apparatus for filling casks or like vessels with..... A. B. von Ech
 Loading or unloading apparatus..... J. Randall
 Lock..... F. M. Thompson
 Lock..... W. J. Carroll
 Locking mechanism..... F. H. Richards
 Locking mechanism, Coin controlled..... W. H. Scott
 Locket..... H. D. Hough
 Locomotive tender gate..... W. R. & R. Pitt
 Loom shuttle checking means..... H. Wilkinson
 Loom shuttle motion..... M. O. Steere et al
 Loom temple, Thread cutting..... A. A. Hull
 Loom weft tension means..... B. F. McGuiness
 Lubricating device..... W. B. Potter
 Lubricator..... L. Chapman
 Mail pouch catching and delivering mechanism..... W. B. Rohmer
 Malt turning apparatus..... G. Eisner et al
 Mandrel, Collapsible..... E. Moxham
 Manhole, Conduit..... H. C. Baker
 Match making machine..... J. P. Wright
 Matte, Producing..... R. Baggaley et al
 Mattress filling machine..... G. W. Wareham
 Mechanical movement..... A. W. Barr
 Medicines for hypodermic purposes, Packaging of..... H. Hager
 Metal sitting and stretching machine..... J. F. Golding
 Metallic tie..... E. M. Dolan
 Meter..... W. R. Sharp
 Mining, Apparatus for laying the dust or pulverized rock in..... T. J. Britten
 Miter box..... 2 pats..... F. H. Richards
 Miter box frame..... F. H. Richards
 Molds, Apparatus for producing sand or other..... J. W. Fraser
 Mortising machine..... G. A. Ensign
 Moth exterminator..... H. H. Kennedy
 Motor..... M. Alger
 Motor control, Alternating current..... G. Winter et al
 Multiple cylinder engine..... J. G. Callan
 Music chart..... H. L. Branson
 Musical apparatus accenting mechanism, Mechanical..... R. W. Piau
 Musical instrument, Stringed..... C. M. Funk
 Nail inspecting machine..... C. W. Sponsel
 Necktie holder..... F. L. Wooley
 Nut lock..... E. Wacker
 Nut wrench, Axle..... G. C. Luther
 Oil burner..... J. Hewitt
 Ore, coal, &c., Apparatus for feeding..... W. R. Smith
 Ores by dissolving in molten bases, Recovering values from..... R. Baggaley et al
 Ornamental structures, Device for forming..... L. B. Christopherson

Ore concentrator..... H. E. Marsh
 Packaging machine conveying and delivering means..... E. Fideil
 Paints and paint vehicles, Production of..... E. H. Strange et al
 Paper board, Machine for making..... T. W. McFarland
 Party line measured service system..... J. L. McQuarrie
 Pasteurizing apparatus..... A. H. Reid
 Pea huller..... C. W. Moore
 Pedal, Folding..... T. Danouard et al
 Pen filling device, Fountain S. A. Vandewater
 Pen, Fountain..... O. E. Weidlich
 Pen, Fountain..... 2 pats..... A. B. Davis
 Pencil case, Noiseless..... E. E. Wilhelm
 Perambulator, Folding..... D. & J. J. Simpson
 Photographic half tone color screen and chart..... A. G. Russell
 Photographic printing outfit case or box..... L. Meir
 Photographic tray rocker..... W. G. Wolfe
 Piano, Manually or mechanically operated..... T. Danquard
 Pianos, organs, &c., Mandolin orchestral attachment for..... N. E. Nelson
 Pianolas, Folding padel for..... M. S. Wright
 Piling, Metal..... J. J. Harold
 Pipe coupling or connection..... F. W. Carlson
 Pipe expanding and flanging tool..... L. D. Lovekin
 Pipe joint, Soil and sewer..... W. E. J. Lutz
 Pipe mold..... M. T. Stevens
 Pipe wrench..... L. Mills
 Pistol, Fire craker..... H. W. Potter
 Plane..... J. A. Traut
 Plane..... A. W. Campbell
 Plant chopper or cutter..... J. W. Arthur
 Planter, Riding corn or cotton..... W. L. Casaday
 Playing ball..... H. Bentz
 Plow..... J. B. Jarmin
 Plow, Automobile..... H. B. Burdick
 Pneumatic tube system..... F. F. Atwood
 Post card exhibitor..... J. Koehler
 Potato desiccating apparatus..... T. Lackovic
 Powder grain, Smokeless..... H. Maxim
 Power transmitter..... F. W. Yost et al
 Power transmitting mechanism, Clutch device..... T. L. & T. J. Sturtevant
 Pressure transmitter..... L. L. Prescott
 Printing and registering machine, Ticket..... W. I. Ohmer et al
 Pulley..... H. J. Gilbert
 Pulp beater..... W. White
 Pump, Direct acting..... H. F. Frisbie
 Pump, Force..... C. Schellhammer
 Pump regulator..... C. Quinley, Jr
 Pump rod attachment..... A. Anderson
 Pumping mechanism, Gas apparatus..... H. Hayes et al
 Puzzle ball..... W. E. Hoy
 Rail bond former..... W. H. Wherry
 Rail cutting machine, Portable track..... T. E. O'Neil
 Rail joint..... F. Lieske
 Rail system, Third..... T. Jenkins
 Railway and controlling device therefor, Electric..... W. B. Potter
 Railway current collecting device, Electric..... A. A. Shobe et al
 Railway, Electric..... P. Farnsworth
 Railway, Elevated and subaqueous..... R. C. Sayer
 Railway gate, Pneumatic..... F. E. Wilson
 Railway or other vehicles, Automatic coupling for..... E. C. Gayer
 Railway rail safety support..... W. Hall
 Railway safety appliance..... R. B. Williams
 Railway street crossover..... F. A. Brewer
 Railway tie..... F. M. French
 Railway tie, Metal and wood..... R. W. Crawford
 Railway trains, Apparatus for automatically stopping..... H. G. Sedgwick
 Range finding and sighting appliance for weapons..... L. O. Beal
 Razor, Safety..... O. S. Terry
 Receptacle..... R. Y. Bradshaw
 Record medium..... E. D. Casterline
 Reduction mill, Gradual..... D. R. Morrison
 Reel support, Detachable..... A. S. Baker
 Registering triangle..... J. H. Dougherty
 Reversing engine..... J. Fawell
 Reversing switch..... G. H. Hill
 Ribbon clasp..... D. W. Scott
 Rifle sight, Combination..... C. Kiessig
 Rinsing machine..... I. E. Palmer
 Rivet marker..... C. P. Eagle
 Roasting furnace..... reissue..... L. T. Wright
 Rock drill..... F. L. Whitehead
 Rock drilling machine cores, Apparatus for rinsing..... J. Brejcha
 Roller screen..... F. M. Spiegle
 Rolling mill..... V. E. Edwards
 Rotary engine..... A. Carville
 Rotary engine..... W. M. Hoffman
 Rotary engine..... W. D. Labadie
 Rule, Combination..... J. E. Wertz
 Safety oil..... A. J. Meier
 Samoling tube..... L. W. Walter
 Sash fastener..... L. Schley
 Sash fastener..... W. Goodcell
 Sash fastener, Window..... J. G. Reilly
 Sash lock..... J. M. Butcher
 Saw detaching mechanism..... F. H. Richards
 Saw guide..... 2 pats..... F. H. Richards
 Saw guide clamp..... F. H. Richards
 Sawing apparatus, Multiple..... H. Dalgety
 Scale..... W. F. Stimpson
 Scale, Grain weighing and bagging..... A. G. H. Bostelmann
 Scale, Spring..... S. R. Munsou
 Screen hanger and fastener, Swinging..... W. Romuender et al
 Screw driver and holder, Combined..... S. P. Lapham
 Seal..... A. B. Schofield
 Search light mounting..... W. O. Webber et al
 Self clamping bracket, Adjustable..... C. E. J. Dile
 Separation, Process of..... A. Schwarz
 Sewing machine stand drawer lock..... W. C. Foley
 Sewing machine, Shoe..... C. Hildebrandt
 Sewing machine thread clamping device..... R. L. Lyons
 Shade or curtain holder..... H. H. Forsyth
 Shades to rollers, Device for attaching window..... W. D. James

Shaft coupling pin. Double legged vehicle.... J. M. Bawden et al
 Shafts and rocker arms. Union for rock.... F. H. Richards
 Shears..... G. Voellner et al
 Sheet holder. Loose..... A. Lawson
 Shift key mechanism..... F. X. Wagner
 Shingle mill..... W. Thorp
 Shoe..... J. M. Le Lievre
 Shovel handle bending machine..... J. E. Foulkes
 Signaling system. Selective..... W. M. Davis
 Silo or tank..... L. G. Lease
 Sled..... W. A. Shephard
 Sled. Self propelled..... J. Erdelyi et al
 Sleigh..... E. Michaud et al
 Smelting ore and cleaning converter slag..... R. Bagdaley et al
 Smoke consumer..... H. White
 Soap receptacle and distributor. Liquid..... T. P. Jarvis
 Soap tablet..... A. E. Hughes
 Soldering machine. Can..... J. A. Booth
 Sound record or blank support..... L. Steinberger
 Sound reproducing apparatus..... J. J. Wellner
 Speed controller..... E. R. Douglas
 Speed device. Variable..... W. E. Crane
 Spelter. Making..... O. Narel
 Spike making machine..... J. Lowry
 Sprinkler..... L. T. Jarrard
 Stacker. Pneumatic..... E. L. Griffin
 Stacker. Wind..... H. E. Bradley
 Stake pocket..... M. S. Curley
 Stalk cutter..... R. C. Tally
 Stereoscope spring clamp..... T. W. Ingersoll
 Storage battery..... F. T. Cable et al
 Storage system..... W. J. H. Bohannan
 Storage vessels. Treating..... V. Lapp
 Store..... W. H. Calkins
 Stovepipe holder..... M. Alston
 Stovepipe holder. Tent..... J. McFadzean
 Street sweeping machine..... J. P. Clark
 Suspender. Trousers..... J. T. Gradon
 Switch control system. Remote..... J. L. Hall et al
 Syringe. Hypodermic..... 2 pats. R. Walsh
 Table..... J. Herzog
 Tack plate feeder..... E. N. Reed
 Tapping machine. Automatic reversing..... G. B. Painter
 Telegraph instrument. Receiving..... C. R. Underhill
 Telegraphic apparatus..... C. Meray-Horvath
 Telegraphic instrument..... A. R. Dickey
 Telegraphy..... F. W. Jones
 Telephone box..... C. C. Hughes
 Telephone exchange service meter..... J. L. McQuarrie
 Telephone exchange system..... I. Kitsee
 Telephone locking mechanism..... R. W. Goeb
 Telephone messages. Apparatus for transmitting..... E. W. Day
 Telephone system..... W. M. Davis
 Telephone transmission..... 2 pats. I. Kitsee
 Telephony..... I. Kitsee
 Telephonogram apparatus..... C. Hulsmeier
 Temperature regulation system..... F. M. Schmidt
 Theatrical appliance..... I. Greene
 Theatrical curtain actuating mechanism..... S. H. Garrett
 Thermometer. Clinical..... C. W. Meinecke
 Threshing machine..... C. H. Bidwell
 Tile..... W. E. Rivers
 Tin plate mill catcher. Automatic..... C. A. Bottorff
 Tire covers. Apparatus for use in manufacture of wheel..... F. S. Ornstein
 Tire nut tightening device..... P. Lorange
 Tire. Pneumatic..... H. A. Palmer
 Tire. Wheel..... A. H. Marks et al
 Tobacco stemming machine..... E. C. Phillips
 Toilet comb..... W. Winans
 Track fastener..... H. J. Conrath et al
 Train safety device..... J. L. Kuhl et al
 Trees. Spring board attachment for felling..... C. W. Schilling
 Trolley..... O. Funkhouser
 Trolley. Electric..... G. Ondo
 Trolley wheel..... J. T. McCafferty
 Trolley wire hanger cut out..... G. Hall
 Trousers press..... O. M. Morse
 Tube flanges. Machine for attaching..... W. W. Doolittle
 Tube forming machine..... J. H. Schlafly
 Tubes, rods, &c. Drawing machine for..... L. C. Smith
 Turbine..... J. Stumpf
 Turbine..... E. Cheshire
 Turbine blade..... E. Cheshire
 Turbine governing mechanism..... E. Cheshire
 Turbine. Steam..... P. T. Perkins
 Type holder..... H. S. Folger
 Type setting laundry marking machine. Automatic..... J. C. Hume
 Type writer copy holder..... E. J. Bonine
 Type writers, &c. Carriage shifting mechanism for..... L. Myers
 Type writers or the like. Type bar construction for..... reissue. E. F. Kunath
 Type writers, &c. Platen for..... J. H. Dyett
 Type writing machine type cleaner..... A. M. Wing
 Umbrella locking device..... E. Ekman et al
 Vaginal irrigator..... C. O. Farrington
 Valve. Fusible plug..... J. L. Dowus
 Valve mechanism. Blowing engine..... E. G. Rust
 Valves in pipes, &c. Means for connecting..... R. A. Brooks
 Vault. Burial..... J. W. Pettibone
 Vehicle..... J. E. Armstrong
 Vehicle brake..... M. J. Todd
 Vehicle controlling mechanism..... J. A. Charter
 Vehicle gear..... F. E. Wilcox
 Vehicle. Motor..... J. W. Moakler
 Vehicle. Motor..... L. Bollee
 Vehicle. Motor..... F. Patee
 Vehicle running gear..... W. Dieter
 Vehicle. Tip cart..... C. Pay
 Vehicle top members of plastic material or paper. Means for producing T W McFarland
 Vehicle wheel..... A. Turkington
 Vehicle wheel..... H. H. Taylor
 Vending apparatus..... O. Jaeger
 Vending machine..... W. H. Humphrey
 Vending machine. Coin controlled..... G. W. MacKenzie
 Vending machine. Paper..... I. A. Greenwood
 Vessel closure..... C. H. J. Dill
 Vessel handle..... T. E. Crawford
 Vessel safeguarding device..... F. Schmitt

Violin bow guide..... H. S. Strauss et al
 Wagon jack..... L. J. Grant
 Wall lining..... L. Patterson
 Warping machine clock mechanism..... A. E. Rhoades
 Washing machine..... W. D. Whitney
 Watch protector..... R. Adolph
 Watch winding mechanism..... J. Bond
 Watchmaker's pivot pin grinding device..... D. Abeles
 Water circulating device..... G. Kimball
 Water meter..... G. B. Bassett
 Water seal trap..... J. E. Keyt
 Water tube boiler..... T. J. Barbour
 Water wheel shaft bearing..... F. Trump
 Waterer. Hog..... B. F. Booth
 Weeder. Sulky..... G. B. Davison
 Welding apparatus. Ring..... G. W. La Voo
 Welding clamping device. Electric..... A. F. Rietzel
 Wells from oleaginous obstructions. Apparatus for freezing oil..... J. Yeast
 Wheel..... F. P. White
 Wheel brace..... R. H. Scott
 Wheel fender..... J. Ortnier
 Wheels. Flexible metal band for traction..... E. O. Doak
 Whistle. Automatic steam..... H. A. Ewald
 Winding machine..... J. F. Middleton
 Winding mechanism. Fabric machine V Hoxie
 Windmill..... W. J. Clemson
 Windmill..... J. J. McLean
 Windmill..... W. P. Brett
 Window screen..... C. H. Comstock
 Window screen and guard..... A. Johnston
 Window ventilating lock..... H. B. Ives
 Wire reeling apparatus..... B. F. Reichenberger
 Wire stretcher clamping device..... J. A. Clements
 Wrench..... E. K. Ansoorge
 Yarn package..... G. W. Foster

DESIGNS.

Rug..... 7 pats. A. Petzold
 Spoon. Souvenir..... W. M. Davis
 Spoons, forks, or similar articles. Handle for..... S. Stohr
 Stove..... J. P. Ouerbacker

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Accumulator..... J. A. Lyons et al
 Air brake accelerator..... V. C. Tasker
 Air compression and utilizing device..... M. C. Wilkinson
 Alloy. Metallic..... C. A. Meadows
 Amalgamator..... W. E. Vandenberg
 Amalgamator. Dry sand..... F. J. Hoyt
 Amusement bath and swimming school. Hygienic..... C. P. Randolph
 Amusement device..... W. J. Keefe
 Arc light systems. Regulator for alternating series of..... J. H. Hallberg
 Arm. Artificial..... J. V. Bennett
 Automatic switch..... W. D. Simpson
 Automobile..... E. J. Jenness
 Automobile controller..... A. C. Stewart
 Awning fixture..... A. De Simone
 Ax head..... W. Hatcher
 Axle box. Car..... J. W. Stephenson
 Axle. Vehicle..... P. C. Peterson
 Badge..... D. K. Stone
 Bag fastener..... 2 pats. B. Vom Eigen
 Bale tie..... W. Ross, Sr
 Balls, &c. Composition for bowling..... J. B. Onley
 Band fastener..... H. L. Wagner
 Bearing for wheels, pulleys, &c..... G. Dornauf
 Bearing. Self lubricating carriage..... G. W. Nickerson
 Bed. Folding sofa..... L. N. Bachand
 Bed or couch..... J. Hoey
 Bed. Sofa..... L. N. Bachand
 Bed. Sofa..... T. Hauser
 Bedstead..... R. H. Wheeler
 Beer, ale, or porter drawing machine. Steam..... A. L. Malone
 Belt splice..... D. T. Clemens
 Binder..... L. M. Leslie
 Binder..... H. F. Huelster
 Binder for ledgers, &c. Loose leaf..... H. J. Moore
 Binder. Loose leaf..... C. C. Maltby
 Binder. Loose leaf..... L. Anderson
 Binding apparatus. Loose leaf..... P. A. Eftofie
 Boat leak detector. Portable automatic..... W. F. Cogan
 Body brace..... J. U. Adams
 Book stack..... B. R. Green
 Book supporter..... L. C. De Carli
 Bookbinding..... C. Chivers
 Boring tool adjustable support..... C. A. Strand
 Bottle..... W. E. Moyer
 Bottle. Non-refillable..... H. Tolke
 Brake..... V. P. Taylor
 Brake..... J. E. Berry
 Brazing..... H. F. Hiller
 Brazing compound..... H. F. Hiller
 Brick. Making..... O. G. Diefendorf
 Bricks for building purposes. Composition for..... H. M. Hammore
 Bridge bit..... H. J. Ormsby
 Brush. Fountain..... W. J. Wright et al
 Buckle..... L. Sanders
 Buckle. Suspender..... D. L. Smith
 Building construction..... J. O. Fisher
 Button. Cuff..... T. Fenton
 Cage. Automatic dumping..... A. T. Smith
 Calculating device. Mechanical..... A. W. Steele
 Calculator..... C. H. Speckman
 Calculator canceling mechanism..... D. E. Felt
 Camera..... A. T. Newman
 Camera multiplying attachment..... A. L. Swartz et al
 Cameras. Air check exposing device for..... F. E. Cheesman
 Can opener..... G. Agobian
 Cans. Machine for venting and restopping vents of..... S. Haigh
 Cans. Manufacture of decorated or labeled drawn..... J. Shirreffs
 Candy pulling machine..... G. M. Griswold
 Cane and folding stool. Combined..... C. S. Rogers
 Cane and stool. Combined..... C. S. Rogers
 Cap..... S. Blachmann
 Car coupling..... G. A. Rriegleb
 Car coupling..... D. Westcott

Car coupling auxiliary connection..... W. N. Shephard
 Car discharge valve. Automatic..... W. A. & B. S. H. Harris
 Car doors. Mechanism for operating dump..... S. Otis
 Car fender..... H. W. Howe
 Car fender. Street..... E. H. Schulze
 Car. Grain..... M. Brosnan
 Car indicator. Street..... P. J. Mann
 Car. Mail and express..... W. B. Young
 Car. Railway..... S. F. Swanson
 Car. Tram..... D. Townsend
 Car ventilator..... A. W. Finlayson
 Car wheel..... G. W. Curfman
 Cars by synchronous electric motors. Propelling railway..... A. Churchward
 Cars. Electrical contact device for intermittently establishing circuits on moving..... J. D. Keen
 Card or paper sheets. Manufacture of..... C. H. Crosier
 Carpet stretcher and tack holding tool. Combined..... A. Rebetej
 Cash register..... J. P. Cleal
 Cash register..... R. M. Watson et al
 Caution. Burner and mixer for..... J. P. Muller
 Central energy system..... W. M. Kelly et al
 Centrifugal separator..... H. McCormack
 Chain coupling. Drive..... G. S. Zepp
 Chalk line reel..... W. H. De Roseau
 Chronological monitor for use with coin-controlled or other machines..... F. P. Gorin
 Chuck. Drill..... E. H. Byer
 Cigar making machine..... C. L. Driefer
 Cigar or cigarette holder..... I. A. Heald
 Cleaning fluid..... T. H. Jackson
 Clipping machine..... C. M. Chandler
 Clock..... W. E. Porter
 Clock ratchet wheel..... T. B. Stephenson, Jr
 Cloth cutting machine..... C. D. Mattison
 Clothes pin..... S. A. Briney
 Clothes pressing machine..... A. T. Beach et al
 Clothes washer and wringer. Combination..... L. C. Gillespie
 Coin actuated machine attachment..... H. C. Hart
 Coin receptacle locking mechanism..... R. J. Louis
 Coke oven. Horizontal..... H. Poetter
 Collar. Horse..... B. F. Chapman
 Collar stuffing machine..... C. L. Allen
 Collar with combination plate. Throatless horse..... J. B. Vogelsang
 Conduit joint. Underground..... W. L. McGowan
 Copy holder..... J. Auld
 Copying press..... A. L. Sneed
 Corn ground. Machine for preparing and ridging..... A. Gubrud
 Corset..... A. P. McGraw
 Corset..... T. H. Baker
 Corset..... V. E. Mack
 Corset attachment..... E. J. Montigny
 Cotton picker..... C. R. Harvin
 Crate. Shipping..... J. M. Kenny
 Crematory..... F. P. Smith
 Cultivator..... W. H. Page
 Cultivator..... W. A. Hancock
 Cultivator connecting arch..... E. Schulz
 Curtain..... O. B. Kaiser
 Cupidator. Automatic self cleaning..... J. Loh et al
 Damper. Stovepipe..... C. M. Buller
 Dead centers. Device for overcoming..... L. Swenson
 Denitrating plant..... R. Evers
 Derailing block..... M. C. Mitchell
 Desk. Telephone order..... J. W. Schmidt
 Dishing and flanging machine. Combined..... L. Hjorth
 Display card attachment..... L. Lemos
 Display rack..... J. Clinton
 Distilling apparatus. Wood..... 2 pats. B. Viola
 Door closer..... W. L. Pease et al
 Door holder..... C. A. Mann
 Door spring and check. Combined..... J. J. Larimer
 Drier..... A. A. Leyer
 Drying apparatus..... H. Baetz
 Drill..... F. & R. P. Russell
 Drill support. Hand..... F. P. Shek
 Drilling machine..... F. W. A. G. & E. A. Hoefler
 Drilling machine..... H. B. Keiper
 Dye. Anthracene..... R. Bohn
 Dye. Brown mordant..... A. L. Laska
 Dye. Dark brown wool..... A. L. Laska
 Dynamos. Suspension means for axle driven..... R. M. Newbold
 Easel..... J. Assel
 Egg preserving compound..... N. J. Dobbins
 Electric lock..... A. Haesner
 Electric motors. Means for regulating..... 2 pats. J. G. V. Lang
 Electric motors. Regulating..... 2 pats. J. G. V. Lang
 Electric switch..... A. E. Handy
 Electrical converter..... W. B. Churcher
 Electromagnet locking device..... W. Baxter, Jr
 Elevating and dumping platform..... W. H. Flannery
 Engine..... reissue. C. A. Braden
 Excavating apparatus..... J. Lennou
 Excavator..... J. H. Miller
 Exercising machine..... L. Pelletier et al
 Exhauster and compressor. Motor driven..... M. D. Compton
 Fan. Rocking chair..... B. F. Gilmer
 Fare indicator and register..... J. H. Johnson
 Fashioned textile fabric and producing same..... G. Lanzendorfer
 Fastener..... J. H. Pilkington
 Feeder. Steam boiler..... L. C. Parker
 Feeding device. Stock..... E. C. Mueller
 Fence post base..... S. C. Powe
 Fence tightener. Wire..... W. H. Kuhlman
 Fertilizer distributor and grain drill. Combined..... J. M. Olinger
 File. Card..... L. Senge
 Filter..... W. G. Tousey
 Filter plant..... R. Kurka
 Fire escape..... 2 pats. H. J. Noll
 Fire extinguishing system. Fluid pressure..... F. E. Chapman
 Fire resisting door or blind..... H. E. Vance
 Fishing reel frame or spool head facing..... A. F. & W. Misselbach, Jr
 Flange forming machine..... A. Dewes
 Flanging machine..... H. Diecks
 Flash boiler..... H. Lemp
 Float..... F. & F. H. Engelhard
 Flooring..... G. H. Kimball
 Flue cleaner..... J. B. Brittain

Fly catching device..... H. Haner
 Fly trap..... J. R. Hagstrom
 Folding and transportable elevator..... D. B. Cook
 Folding box..... Z. B. Webb
 Folding chair..... C. Miller et al
 Folding table..... F. M. Burrows
 Foot power mechanism..... M. Slotkin
 Fuel. Artificial..... D. Markfeld
 Furnace..... F. B. Smith
 Furnace fire arch..... D. J. McKenzie
 Furnace for burning materials..... C. W. Stanton
 Furnace for melting metals or other purposes..... C. Spiegel
 Furnace fuel feeding device. Boiler..... 2 pats. J. & W. Reagan
 Furnace valve..... J. Kennedy
 Furnaces, gas generators, &c. Charging device for..... A. Ronay
 Garden tool..... N. W. Coon
 Garment..... C. Kenyon, Jr
 Garment hanger..... J. J. Quinn
 Gas burner..... R. Sticksdorn
 Gas burner safety attachment..... I. C. Moulton
 Gas compressor..... C. Flohr
 Gas engine..... P. Schmitz
 Gas generator..... J. H. Eustace
 Gas generator. Acetylene..... P. C. Avery
 Gas generator. Hydrogen..... W. Kirkwood
 Gas producer..... J. R. George
 Gas retort setting. Recuperative..... E. H. Earnshaw et al
 Gear. Speed changing and transmission..... I. H. Pleukharp
 Girder. Concrete or like..... F. Pohlman
 Glass and oven for same. Apparatus for flattening cylinders for making window..... C. J. Hurrell
 Glass cutter..... H. F. Hughes
 Glass pressing mechanism..... F. O'Neill
 Glass working machine..... J. W. Colburn
 Gold dredging machine tumbler..... O. B. Perry
 Grain transporting apparatus..... G. W. McNear Jr
 Grinder. Slitter..... A. Bess
 Grinding machine..... T. H. Symington
 Hair pin..... C. E. Koehl
 Hair restorative..... V. F. Beede
 Hammer controlling mechanism. Drop..... H. J. Hude
 Hammer. Duplex power..... W. W. Word
 Hammer. Electric..... J. Chambers et al
 Hammock swing..... W. H. Frampton
 Harrow and planter. Combined..... C. A. Johnson
 Harrow or cultivator teeth. Device for fastening..... S. V. Kennedy et al
 Harvester. Corn..... M. Kane et al
 Harvester divider attachment..... C. A. A. Rand
 Harvester reel support..... J. W. Pridmore
 Harvester wind flag..... D. W. Smith
 Hat die..... J. P. & J. Frugollet et al
 Hat fastener locking device..... J. R. Gallagher
 Hay press..... N. Cayouette
 Hay rake..... M. Kane
 Hay rake..... F. P. Burkhardt
 Heat. Apparatus for transmission of..... R. Wadham
 Heating furnace. Continuous..... J. Reuleaux
 Heel calk for shoes. Detachable..... C. H. Swenson
 Hoisting mechanism for sucker rods, &c..... W. M. Brown
 Honey extractor..... C. W. Metcalf
 Hoof trimmer..... G. W. Thomas
 Hoof trimming and paring..... W. G. Jackson
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 Lightning arrester..... C. T. Mason
 Link. Mending..... M. L. Livingston et al
 Linotype machine..... J. R. Rogers
 Liquid cooler..... J. O. Beazley
 Liquid fuel burner..... H. A. Frantz
 Liquid gage. Safety..... C. A. Harvey
 Loading device. Automatic..... H. C. Williams
 Loading or unloading apparatus. Inclined guide for..... C. A. Long
 Lock..... K. Muchowicz
 Lock..... H. Landsberg
 Lock..... E. L. Kraus
 Locomotive cab seat..... B. W. Anderson
 Loom..... J. W. Sharkey
 Loom..... J. R. Fitton
 Loom weft furnishing, &c., mechanism..... H. I. Harriman
 Loom. weft replenishing..... H. I. Harriman
 Looms. Brocading apparatus for ribbon weaving..... J. P. Gelas
 Lubricator..... G. B. Essex
 Magnetic materials. Making..... R. A. Hadfield
 Magnetic separator..... M. Dings
 Mail pouch..... J. J. Russell, Jr
 Manicure tool..... H. Wilcox
 Marble. Manufacturing artificial..... F. Oliva
 Marking gage..... F. A. Tustison
 Massage machine..... 2 pats. C. Pfanschmidt
 Matting end..... M. J. Wilson
 Measure. Finger..... E. A. Stemm
 Measuring machine or meter..... E. Ek
 Mechanical movement..... J. R. Carter
 Mechanical movement..... J. E. Hausfeld
 Mechanical movement..... G. W. Foster
 Mechanical movement..... W. Richardson
 Mechanical movement..... D. A. Carpenter

Metal. Dividing.....C. A. Meadows
Metal shearing device.....D. E. Eddleman
Metal working machine.....M. C. Johnson
Metals. Apparatus for vacuously depositing.....T. A. Edison
Metallic mat.....F. P. Wells
Meter.....J. H. Connell
Milking.....D. T. Sharples
Milking apparatus teat cut.....D. T. Sharples
Monkey wrench.....J. Doyle
Monument picture holder.....G. P. Neall
Mordant. Stearamid.....A. Muller-Jacobs
Motor and pump.....P. K. Wood
Mower.....H. B. Sperry
Mower thill attachment.....H. B. Sperry
Mowing machine hay tedder attachment.....S. M. Martin
Muffler.....S. W. Murray
Music chart. Mechanical.....S. B. Turner
Music roll perforating device.....H. P. Ball
Music sheet perforating apparatus.....E. C. Phillips
Music sheets. Perforating.....E. C. Phillips
Musical instrument.....N. Turturro
Notching machine.....M. von Pein
Nut lock.....N. Payne et al
Nut lock.....M. Bertalett
Nut lock.....W. H. Burnett
Nut lock.....J. F. F. Landis
Oar. Bow facing.....J. H. Durant
Odoriferous compound. Making.....E. Knoevenagel
Oil burner.....J. A. Young
Oil can.....L. H. Keroack
Optical testing instrument.....E. Eimer
Optometer.....H. C. Paul
Package or crate. Collapsible.....W. L. Haines et al
Package tying device.....D. A. Carpenter
Paper. Antiseptic wall.....E. E. Pray
Paper cutting and folding machine.....S. D. Ruth
Paper finishing machine.....C. E. Torrance
Paper for making envelopes.....G. Reese
Paper mills. Paper stuff water circulating apparatus for.....R. Dietrich
Paper perforating machine.....D. C. Denison
Paper. Toilet.....reissue.....W. M. Davis
Paper winding machine.....G. C. Witham
Paraffining apparatus.....E. L. White
Pea, bean, &c., shelling machine.....J. P. Scovill
Pedal attachment.....H. C. Ross
Pen. Fountain.....S. S. Crocker
Phonograph repeating mechanism.....H. P. Huse
Photograph gallery appliance.....W. A. Bunnell
Photographic developing apparatus. Field.....W. T. Leighton
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Photographic plate holder.....L. Borsum
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Pipe hanger.....H. J. Newberg
Pipe joint.....H. C. Weeden
Pipe wrench.....L. H. & A. C. Plank
Piston.....D. F. Stayman
Plaster of paris. Producing.....W. A. Koneman
Pool table pocket plug.....G. McGee
Pressure regulated controlling device.....A. S. Comstock
Primary battery.....T. A. Edison
Printer's galley.....E. W. Pierson et al
Printing press inking apparatus.....W. Scott
Printing stamp.....L. M. Todd
Propeller. Screw.....A. Krebs
Pump.....E. R. Walker et al
Pump. Spray.....J. Bean
Punching and riveting machine.....E. G. Caughey
Rack bar.....H. E. Rathbun et al
Railway crossing gate.....J. D. Young
Railway crossings. Electrical signaling device for.....J. F. Weinschenk et al
Railway signal apparatus.....S. T. Show
Railway switch.....W. E. Grumbine et al
Railway tie.....J. A. Guiler
Railway tie and anti rail spreader. Combined.....T. C. Thomas
Railway tie. Metal and concrete.....C. H. Quimby
Railway tie spacer.....E. N. Ten Eyck
Railway transportation system.....C. W. Baker
Railway weed destroyer brush.....C. D. Smith
Rat trap.....C. F. Graeber
Refrigerator.....F. W. Wheldon
Refrigerator box.....B. S. Fryar
Refrigerator. Window.....H. C. McClung
Rerailing switch. Automatic.....C. H. Quimby
Rock drill guide.....H. F. Huntington
Rolling mill.....J. Sandner
Rotary engine.....L. E. Stetler
Rotary motor.....M. M. Conger
Rubber tread.....P. W. Pratt
Rule. Engineer's slide.....L. W. Rosenthal
Saddle. Racing.....H. M. Mason
Sash lock.....F. J. Lowery
Saw set.....R. Addison
Saws, &c. Supporting apparatus for drag.....J. Tuisku
Sawing device.....M. Foshee
Scholar's companion.....E. L. Kraus
Seal. Bottle.....W. E. Heath
Selective system. Individual.....B. Brooks et al
Sewer center.....W. D. Keller
Sewing machine. Button.....J. Diehl
Sewing machine. Button.....W. A. Mack
Sewing machine for overseaming and finishing edges of fabrics.....R. W. Scott
Sewing machine guide.....V. Malizan
Sewing machine motor.....H. J. Young
Sewing machine tucker.....W. R. Parsons
Shade holder.....E. A. Russell
Shaft coupling.....A. Thuillier
Shaft hanger.....3 pats.....H. T. Hollowell
Shaft hanger. Sheet metal.....4 pats.....H. T. Hollowell
Shelf book support.....W. H. Brett
Shoe.....C. H. Stamer
Shoe fastening.....J. W. Duff
Shunt motor. Variable speed direct current.....C. P. Steinmetz
Sidewalk elevator.....J. Rieg
Signal mechanism. Electric semaphore.....B. O. Wagner
Signature gathering machine.....S. H. Pray
Sled.....C. E. Burnham
Smoke consuming furnace.....R. Stoker
Smoke consuming furnace.....G. E. & B. Edgcomb et al
Smoke preventing furnace.....W. A. Koneman
Soda arm or faucet.....J. A. McCormick
Spinning frame spinning apparatus.....H. F. Cottle

Spinning ring. Rotary.....V. Belanger
Spinning spindle and bobbin.....J. E. Prest
Spring bottom.....J. Karpen
Spring cushion.....E. Deegree
Spring motor.....C. Pfeiffer
Stamping machine. Envelop.....E. E. Fleming
Steam boiler.....J. F. Casey
Steam drier. Rotary.....J. W. Biles
Steam generator.....C. F. Ruby
Steam without the production of high pressure
Producing high temperature by the use of.....W. B. D. Penniman
Stereotype matrix press.....J. C. Bonneau
Stock rack.....R. S. Brown
Stoker. Mechanical.....J. & W. Regan
Stool and cane. Convertible.....W. Spiegelberg
Stop motion. Textile machine.....P. Hardman
Stove.....S. C. Bruner
Stoves, &c. Fire pot for.....D. F. Printz
Street and station indicator. Electrical.....L. C. Allen
Stump puller.....P. Hudson
Sugar and malt. Making product of.....W. R. Long
Sweeper. Pneumatic.....W. P. Leister et al
Switch box or case. Electric.....G. E. Neuberth
Switch stand. Semaphore.....A. A. Strom
Tag.....C. H. Kittredge
Target trap carrier.....G. D. Horst
Teat cup.....D. T. Sharples
Telegraph. Printing.....J. D. White
Telegraphic transmitter.....H. G. Martin
Telephone attachment.....F. H. Chamberlin et al
Telephone call mechanism. Selective.....H. I. Hawxhurst et al
Telephone central exchange instalment.....R. M. Beard
Telephone transmitter.....A. Gamache
Therapeutic machine. Electric.....H. A. Slaughter
Thermosensitive device.....W. M. Fulton
Thill coupling.....J. M. Bryant
Threshing machine.....L. M. Thomson
Ticket. Pin.....H. A. Frank
Tire. Non collapsible.....J. T. Dickey et al
Tire. Vehicle.....B. F. Kenua
Toaster.....E. J. Whittlesey
Tobacco pipe.....L. Demuth
Tool. Combination.....A. Buckley
Tool holder.....H. W. Borchers
Tool rack.....J. W. Danhour
Traction device and brake. Electromagnetic.....C. A. Wells
Train signal.....F. Feher
Training machine.....C. L. Hagen
Trolley base and pole or arm therefor.....G. Volker et al
Trolley pole controller.....H. R. De Long et al
Trolley stand.....B. Stenvall
Truck transom.....F. M. Jones
Trunk stay.....C. H. Terry
Tube making machine. Spiral.....H. W. Morrow
Tuck stitch fabric and producing same.....H. A. Houseman
Turbine blade.....G. Westinghouse
Turbine. Elastic fluid.....A. Schneider
Turbine. Fluid viscosity.....B. J. Campbell
Turbine governing mechanism.....J. Wilkinson
Turbine. Marine.....J. Wilkinson
Turbine. Steam.....C. Weichelt
Turning machine. Column and baluster.....C. Mattison
Twine holder.....F. M. Thorpe
Type writer.....2 pats.....J. F. David
Type writer.....J. Hellund
Type writer attachment.....C. J. Bellamy
Type writer feed mechanism.....J. Alexander
Unloading device.....P. O. Bendickson
Valve.....R. M. Popham et al
Valve.....W. T. Harrison
Valve. Air.....C. H. Belden
Valve. Air brake triple.....V. C. Tasker
Valve. Alarm.....H. A. Fiske
Valve. Inflation.....J. H. Spray
Valve. Reciprocating cylindrical.....A. B. Denson
Valve. Thermostatic.....W. E. Barnes
Valve. Steam engine.....J. Horton
Vehicle body.....E. Demsky et al
Vehicle brake.....H. R. MacDonald et al
Vehicle flue construction.....A. A. Ball, Jr
Vehicle flue construction.....H. Lemp
Vehicle frame.....T. B. Rennell
Vehicle. Motor.....G. Laue
Vehicle runner. Wheeled.....E. E. Drury
Vehicle wheel.....G. N. Beal
Vehicle wheel.....S. F. Swanson
Vehicles. Safety device for electrically propelled.....J. H. Spencer
Vending machine.....J. Jonson
Vending machine.....J. Greul
Vending machine.....C. M. Mitchell
Vending machine. Coin controlled.....T. R. Priebe
Vending machine. Coin operated.....L. R. Brown
Vending machine coin selective and coin actuated mechanism.....C. H. Joy et al
Vending machine ejector.....J. E. Packard
Washer making machine.....H. C. Hart
Washers. Making.....2 pats.....H. C. Hart
Washing machine.....J. J. Oaks
Watch. Stem winding and setting.....A. Bannatyne
Water gate.....W. A. Smith
Water heater.....2 pats.....J. McCartney
Water purification by electrical means. Apparatus for.....J. S. Zerbe
Water purifying apparatus.....W. H. Green
Water purifying apparatus.....R. H. Wiles
Water trap.....J. C. Keller
Weather strip. Metal.....H. E. Kenny
Well point.....W. Patterson
Well point. Drive.....T. L. Decker
Wheel fender.....F. Reichle Jr
Winding silk, cotton, or other materials on wire. Device for.....C. Feising, Jr
Windmill.....R. H. Phillips
Window.....J. N. Scherner
Window frame and sash.....F. A. Winslow
Wire stretcher.....H. L. Ferris
Wire with rubber, &c. Machine for covering.....C. Feising, Jr
Wrench.....J. G. Baker
Wrench.....A. W. Hornberger
Wrench.....L. P. Keller
Wrench.....G. W. Otis et al
Wrench.....J. E. Taylor
Xanthin derivative and making same.....F. Ach
Xanthin. Making.....3 pats.....F. Ach

DESIGNS.

Badge or similar article.....W. H. Peckham
Border for vessels for similar articles.....R. Kintz
Clock case.....3 pats.....L. Marquart, Jr
Clock case.....3 pats.....G. H. Rhynedance
Decalcomania transfer.....M. F. Hahn
Desk. Writing.....W. H. Howard
Glass disk. Cut.....J. Phillips

Heater.....C. H. Boeck
Monument.....J. E. Bradford
Picture frame.....C. S. Casad
Spoons, forks, or similar articles. Handle for.....J. E. Straker, Jr
Stove.....2 pats.....T. R. Kennedy et al
Stove. Heating.....2 pats.....E. B. Adler
Toy figure.....L. Ruchstein
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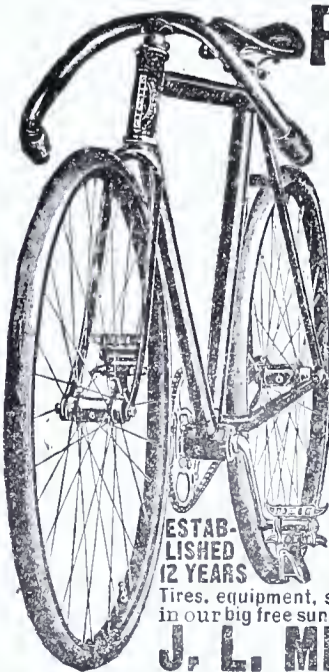
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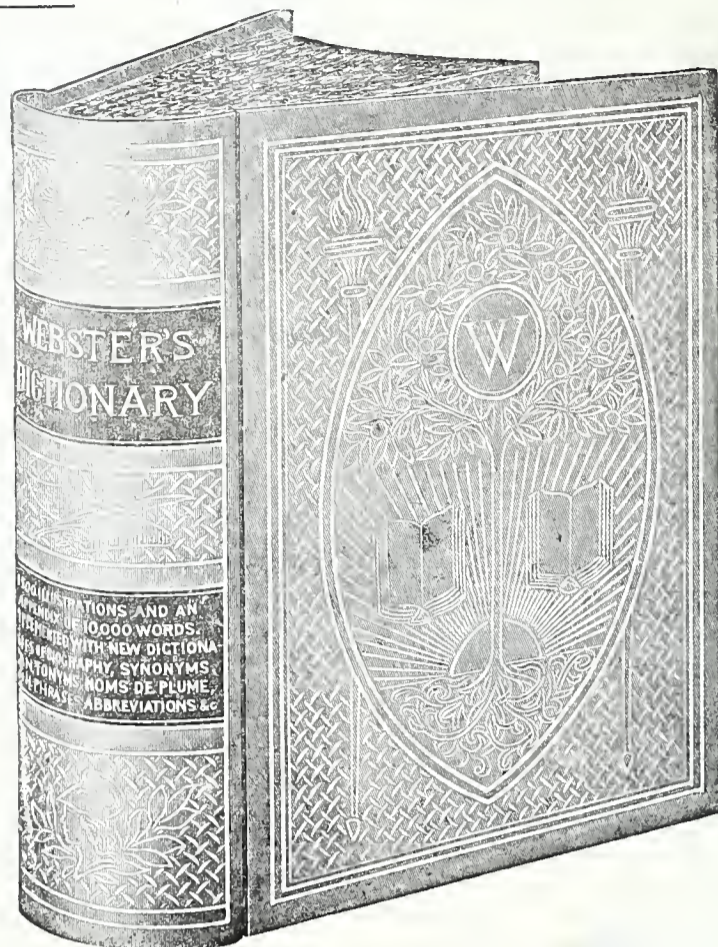
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No. 10.

WASHINGTON, D. C.—OCTOBER, 1904.

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SAFETY AUTOMATIC PETROLEUM ENGINE.

THE Britannia Company of Colchester, England, has brought out a new type of oil engine which has attracted favorable notice. It is claimed to be the only engine which is heated up before starting by an ordinary plumber's lamp, and which will then run, after being started, on all loads, and keep sufficient heat for light loads, besides timing the ignition properly on varying loads. This result is attained by the fact that the principle of the timing in tube ignition is retained; that is to say, until the end of compression it is impossible for the mixture to fire, and the reason why the igniter remains hot, even when completely unloaded, is that special precautions are taken to prevent loss of heat from the igniter by radiation or conduction, as well as getting as intense a heat as possible during the explosion by introducing a portion of the vapor through the igniter, which completely dispels the inert gases. Consequently there is a greater temperature attained in this particular part than if the mixture was diluted with a proportion of exhaust gases, as is the case in the majority of other oil engines. The igniter is, of course, designed to take up the heat as much as possible, and is not constructed of material which rapidly deteriorates, such as asbestos, and as is used in some other engines. These igniters have been in constant use for twelve months and still show no signs of deterioration whatever, and it is believed that the average life would be at least twelve months. They are, therefore, more economical than replacing ignition tubes, as even in the large sized engines they only cost less than a dollar each. The igniter can be taken out by removing one nut, and is arranged so that it may expand and contract freely without breaking any joints.

The success of the engine from the point of view of being entirely automatic almost altogether depends upon the principle and design of the combustion chamber, which, as can be seen by the illustration, allows the majority of the vapor to go directly into the cylinder, while a small portion is drawn through the igniter, and con-

sequently the main charge is not decomposed, and the engine runs with the least possible amount of deposit. The vaporizer is very carefully designed so as to attain the right temperature, and to be easily heated up at starting by means of the waste heat from the lamp which heats the igniter.

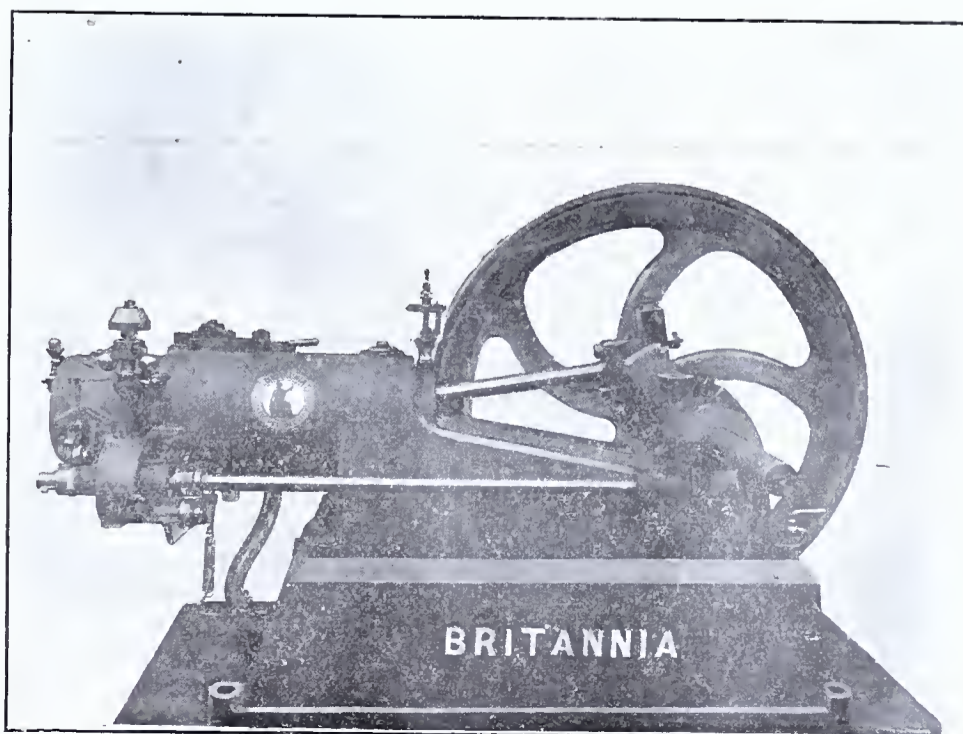
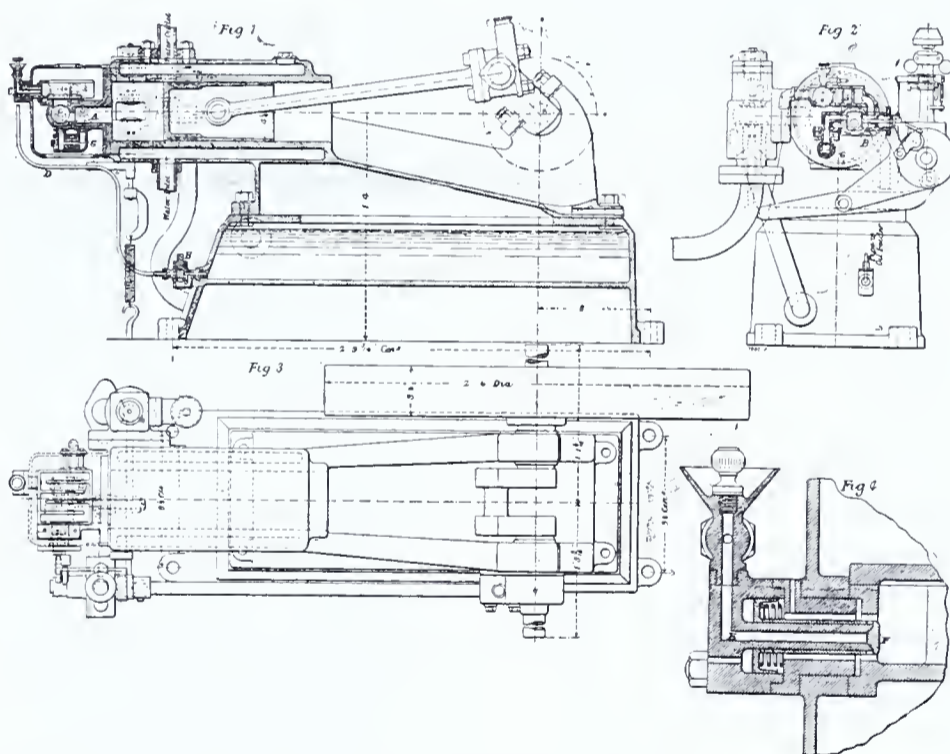
In the larger engines the vaporizer cover is water jacketed, and the circulation is promoted through this at full loads, and can be checked when running on light loads. It is therefore impossible that the vaporizer should attain such a heat as to crack the oil, and at the same time there is sufficient

surface to completely vaporize the oil and consequently avoid any tarry deposits. The oil is vaporized on the best possible principle, being broken up by means of an air current into fine particles of spray and drawn through the heated vaporizer with this comparatively small amount of air, which is highly heated, and passes the oil into vapor under the best possible conditions.

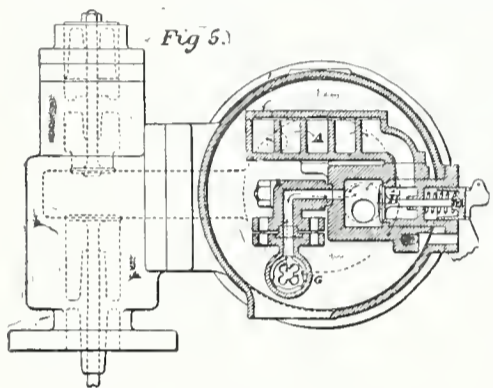
The oil feed is entirely novel, and does away with the necessity of mechanically driven pumps or lifting devices, also the use of small and very delicate parts such as are used in the majority of other oil engines. Besides this, there is no very small nipple or hole which in quite a number of engines has to be used, and in the event of its becoming choked, the engine is, of course, utterly useless. In the Britannia Engine there is no small hole whatever, and the only valve that is used is an automatic check valve, and even without that the engine will run. As this valve is below the level of the oil which feeds it, there is not even the smallest chance of its not working properly, and it has never given any trouble.

The general appearance of the engine is well shown in the photographic view, and, it will be seen, is hardly to be differentiated from any other of the usual types of oil-engines. Its special features will, however, be apparent on studying figures 1 to 3, and the details shown in figures 4 and 5.

As shown in figure 3, the cylinder and its jacket are cast in one piece, while the oil-tank is formed in the bed of the engine; the exhaust and main air-valves are placed on one side of the engine and open into a combustion chamber in the usual way. This combustion chamber is, however, prolonged by the casting A, shown in figures 1 and 5. On its upper side this casting carries a ribbed chamber, which communicates with the interior of the cylinder through a special vapor-valve B, best seen in figure 5. When the engine is running at full load, this vapor-valve is opened at every second out-stroke of the piston by a cam mounted on the side shaft. The piston moving forward



leaves a partial vacuum behind it, which vacuum is communicated to the vaporizer through the open vapor-valve. Air to fill this vacuum enters through the main air-valve and also through an air-pipe communicating with the vaporizer, so that the air charge of the engines enters in part through the vaporizer and vapor-valve, and in part through the main air-valve. A throttle on the inlet to the latter enables the proportions of air entering in the alternative ways to be adjusted as required. At the same time that air enters the vaporizer, oil is also drawn in from the tank in the engine framing, which, it will be seen, is connected to an oil-suction device by the oil-pipe D. This device is shown on a large scale in figure 4. Here the oil enters at the tube E, the open end of which is closed by the sleeve F, the top of which forms a valve, as indicated. A few holes are, however, pierced through the sleeve, so that when it moves out, owing to



the suction of the vacuum on the piston end of the sleeve, oil can be drawn through these holes into the vaporizer. The amount which thus enters is adjusted by means of a throttle on the main air-inlet, since, if this is partially closed, the vacuum in the cylinder on the suction stroke is increased, and hence the oil is sucked up into the vaporizer in greater quantity. Unless the vapor-valve is opened by its cam, there is no vacuum produced in the vaporizer on the out-stroke of the piston. This vapor-valve forms the only means of communication between the vaporizer and the interior of the cylinder, and this fact is relied on to govern the engine. From the vapor-valve two passages communicate with the cylinder. In the smaller of these passages is placed the igniting-plug G. This is simply a piece of steel drilled as shown, so as to leave projecting ribs. These ribs absorb heat during an explosion so that while the main mass of the casting A and the vaporizer attain a black heat only, the piece G, becomes red-hot. It fails, however, to ignite the mixed gases which pass through it on the out-stroke of the engine, because this mixture is too rich to fire. On the compression stroke, however, the gases forced back through the plug become richer and richer in oxygen until ignition finally takes place. On exhaust, none of the waste gases are discharged through the igniter, or superheater. On light loads no gases pass through the igniter or into the vaporizer, unless there is to be an explosion on the succeeding out-stroke. Both plug and vaporizer therefore maintain their temperature, and the engine is not brought to a

stop through unintentional missed ignitions.

The governors are very carefully designed and arranged with a special ring oiler for lubricating the pins, which is a very important matter for close governing. They are adjusted by means of a spring, and there is also a small auxiliary spring for adjusting the speed of the engine when running. The control is over the vapor-valve with a hit-and-miss arrangement of the best possible mechanical design, and which is now almost entirely used by makers of gas engines. The principle of governing, viz.: by completely cutting out the charges, is what is recognized as being the only economical way, and it is the important feature that this engine will completely cut out four or five charges and take one, and run lightly in this manner without external flame or heat whatever. There have been several engines which would run on light loads and which got an impulse at every second revolution, independent of the load. This is the most expensive. Moreover it is impossible to arrange an engine which will run regularly on this principle.

The general design is very carefully thought out, and the liner is drawn into the jacket so as to avoid any water joints. Air and exhaust valves are arranged at the side, so that by removing a small cover these valves can be gotten out in a very few minutes. The cranks and connecting-rods are solid steel forgings, and ample surface is allowed so that the bearings will run cool for very long periods. The gun-metal used in the bearings is Admiralty mixture, and if properly lubricated will run for a very long time without signs of undue wear. The sight feed type of lubricator is used, and the amount of oil can be adjusted to a nicety. The gear wheels are all machine cut, and the piston and liner are made from specially close-grained cast iron. A compression easer is used at starting, and the 12 B. H. P. size can be started by one man. In connection with the oil feed there is a special funnel (Fig. 4) which holds a certain amount of oil, and when this is admitted into the vaporizer the engine starts off without any trouble whatever.

The following parts which exist in other oil engines have been completely done away with:—Constant burning lamp, ignition tube, timing valve, overhead gravity feed, oil pump, air pump, oil measurer, and air blast for starting.

The advantages of an engine not requiring a constant burning lamp cannot be over-estimated. There are uses to which it can be put where it would be absolutely impossible to use an engine with a lamp. In fact, the former is an entirely automatic machine, and it can be left running for hours without any attention whatever, and without any fear or risk of accident. Engines have been erected which are left running during the whole of the night unattended, which it would be impossible to do if the running depended upon a constant-burning petroleum lamp.

ARE OUR PATENT

LAWS DEFECTIVE?

CHARLES M. IRELAN,

[Chief Clerk of the United States Patent Office,
Washington, D. C.]

The recent report that our patent laws are weak and defective, in that they fail to require patented devices to be worked within a certain time after the patents are granted, and that some means should be provided for getting unused and unsalable patents out of the way, is not an eminently wise one.

The patent laws of this country are considered broad, liberal, and judicious. Many of the older countries of the industrial world have adopted various features of the United States system, particularly those relating to the preliminary examination as to the novelty and patentability of the invention. Austria, Germany and Japan make examinations bearing on the novelty and patentability of an invention. Austria requires that the patented inventions must be commercially produced in that country within three years from the date of publishing a grant in the "Patent Journal" of that country. In Germany, a patent may be revoked, after a lapse of three years from the publication of a grant, for failure of the patentee to adequately work his invention in that country or to do all that is necessary to secure such working. Japan annuls a patent if the owner, without reasonable cause, fails to work and produce his invention in Japan within three years from the date of the patent. Mexico formerly required patents to be worked, but abandoned that requirement some years ago. One of the laws of Mexico is to the effect that the state may appropriate an invention under certain circumstances, on payment of a suitable indemnity. The United States does not require the invention to be worked; a patent, if valid at the time it is granted, is valid throughout its term, and cannot be invalidated by any act or failure to act on the part of the patentee or other owner.

The liberality of the United States patent laws is one of the striking features. That liberality, however, does not "block the way" of any one producing an entirely new device. A device possessing features already covered by claims in a prior patent should not, and very properly can not, be used by another person without the consent of the patentee. The expense incurred by many inventors while experimenting with and perfecting their devices, and for the services of competent counsel in order that the application may be intelligently prepared and skillfully prosecuted, and the broadest possible claims secured on the invention, is usually a very considerable item. It would be a great and unnecessary hardship to compel an inventor to manufacture and place his invention on the market within a

limited time,—two or three years, regardless as to whether it was convenient or advantageous for him to do so. It would be just about as reasonable to require the owner of an unimproved lot to build a house on the same, or otherwise improve it within a certain time, notwithstanding he is without ready money to make the improvement or means to raise a sum sufficient for such a purpose.

The inventor who finds his own improvements blocked by an unused or unsold patent of another, simply discovers that he is not what he believed himself to be, the original, first and sole inventor of the article. No one is hindered in securing claims on what is new and useful, nor is it believed to be difficult to purchase a patent which may stand in the way of an inventor's securing all the claims or protection he desires in order to make his invention a successful commercial commodity. The fact that the use of some patent in connection with a later invention is essential to the complete and successful working of the subsequent device proves rather conclusively that the prior patent is not lacking in merit, although the inventor may have been unable to put the article on the market or convince the public of its real merit. Two of the best paying patents ever granted by the United States Patent Office went begging for several years before their real worth was discovered.

The arts and sciences have generally advanced step by step, not by leaps and bounds, and all who aid in their progress should be given the fullest possible measure of protection. Nearly eight hundred thousand patents have been granted by the Patent Office since its establishment; of these, over one hundred and twenty-five thousand have been granted during the past five years. Not one per cent of the latter were pioneer or fundamental inventions. This shows the extent to which the fields of science and art have been explored.

The United States system is undoubtedly the best in the world, and there are believed to be no serious defects in the patent laws. If there are, the absence of a working requirement is not one of them.—*Success*.

Light as a Pain-Killer.

The newest anæsthetic is simply colored light. Professor Redard, of Geneva has discovered, after several years of research, a method of deadening the senses to pain that promises to revolutionize the practice of dentistry.

Finding that the nervous system is influenced by colored light, the professor experimented with the various hues, and soon perceived that blue has a soothing effect on the nerves. Putting this discovery to practical use, he shuts up a patient in a dark room and exposes his eyes to a blue light of 16 candle power for three minutes. This is said to cause him to lose all sense of pain, although he retains consciousness. A tooth may then be painlessly extracted, with none of the after effects on the system which are liable to follow ether or chloroform.

A NEW ELECTRIC CLOCK.

FROM OUR BERLIN CORRESPONDENT.

MOST electric clocks require frequent superintendence for cleaning the contacts, maintaining the battery in working order, etc., and this drawback often offsets the well known advantages of electrical operation as compared with the use of springs. In the following, we propose to describe a system of electric clocks constructed by the Siemens-Schuckert-Werks, Berlin, where the disadvantage alluded to is eliminated in a most efficient manner.

cordingly, of current is extremely low, while the working of the clock is very regular and practically noiseless. Any departures from normal time, as occurring after weeks, are readily compensated for by adjusting the seconds hand. Two good dry cells will be sufficient to keep the works going for 1 1/2 to 2 years.

These electrically driven individual clocks can, on the other hand, be used to operate a number of secondary clocks, the main clock (FIG. 4) closing the current of a battery at short intervals, mostly of one minute, thus causing in all the secondary clocks connected to the system the hands to advance by the electromagnetic effect. The current is closed directly through the running and contact mechanism of the central clock, it being advantageous for the sake of safety to have the direction of each current impulse inverted. The length of contact is variable according to the length of the pendulum, the point of interruption being protected against combustion by a convenient spark preventer.

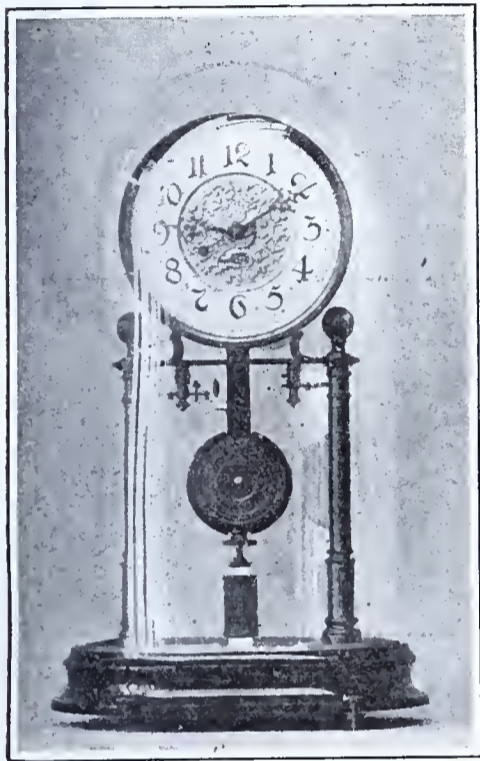


FIG. 1.

FIG. 1, represents a standard clock, being operated independently and permanently from a battery or accumulator, but adapted to be connected to an existing alternate or direct circuit system after a corresponding resistance has been inserted. The clock contains a one-half second pendulum, driven by electricity, so as to do away with the winding-up, as well as a running and contact work, combined in a

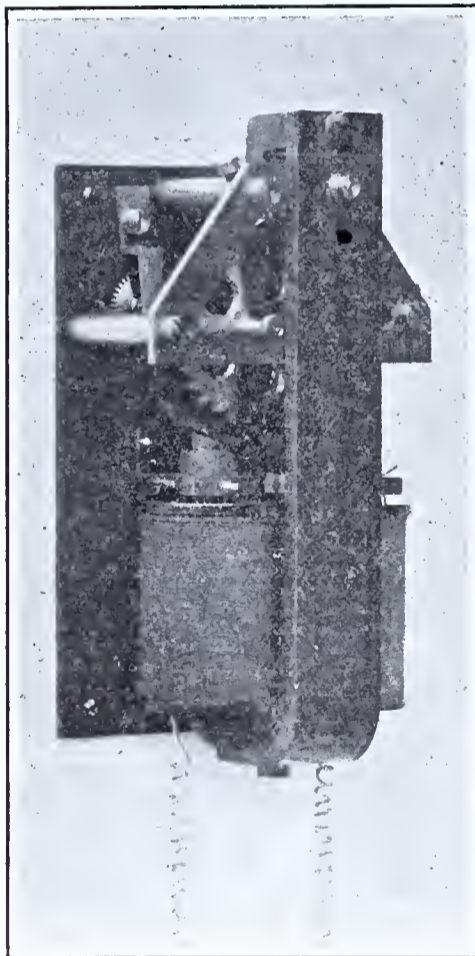


FIG. 3.

Dry elements may be used as a source of current. In the case of a clock having to be operated by high intensity current (continuous current,) and the latter being available only during the day-time, specially constructed accumulators for constant charges may be used and connected to the 65, 110, or 220 volt direct-current systems, inserting a high controllable resistance of sufficient magnitude, so as to be charged permanently with some tenths of an ampere, when any further superintendence becomes unnecessary, and any inserting or disconnecting of the charge can be dis-

pensed with. If the high tension direct current is available both by day and night, the clocks may as well

of even very great hands. The motion of the armature is transmitted direct to the minutes escapement wheel by means of two clicks without any intermediate levers, the path of the armature being limited on both sides by damping stops, so as to render the working of the clock practically noiseless. The current consumption of these clocks is so low as to allow up to 40 secondary clocks being connected on one line to the same central clock, without affecting the working of the contact. When using two lines, 60, and with four lines, up to 160, polarized clocks may be served.

By virtue of this construction, the above described central clock may also be designed as a relay main clock, to be connected to an existing line of clocks like an ordinary secondary clock, it being thus possible to connect the clock system of a building to an existing clock system, so as to give accurately identical readings with the latter. In case of the minute regulation being interrupted temporarily, as a consequence of a breakdown in the main system, the relay clock will go on operating its secondary clocks, being fitted with its own electric drive as an independent device. The adjustment, minute per minute, will go on quite regularly, even in the case of the relay main clock, working in so irregular a way that without electric operation a departure from normal time as high as one hour per day would be observed.

The Siemens-Schuckert Company are also building electrical signal clocks, serving in connection with long-distance switches to automatically connect or disconnect any motors, groups of lamps, etc.

FIG. 5, shows the connections for a



FIG. 4.

be connected direct to the mains through a corresponding resistance.

As regards the secondary clocks, connected to the central clock (FIG. 3,)

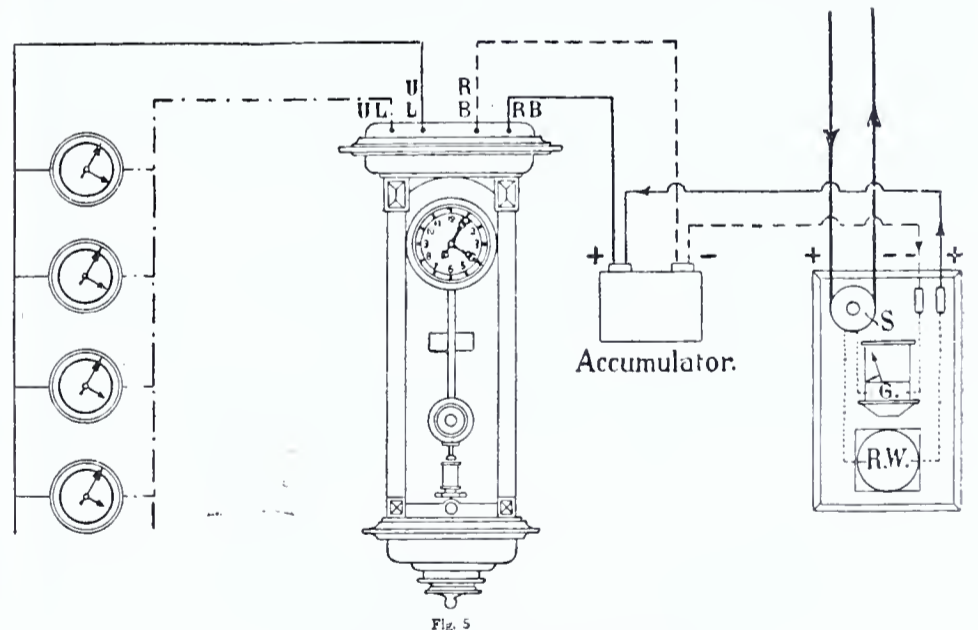


FIG. 5. DIAGRAM OF CONNECTIONS.

these have a construction containing a polarized armature bent from soft sheet iron over a distance large enough to warrant the safe working

clock system for constant charge, a small switch board supporting a galvanoscope, a resistance, and the necessary fuses and terminals.

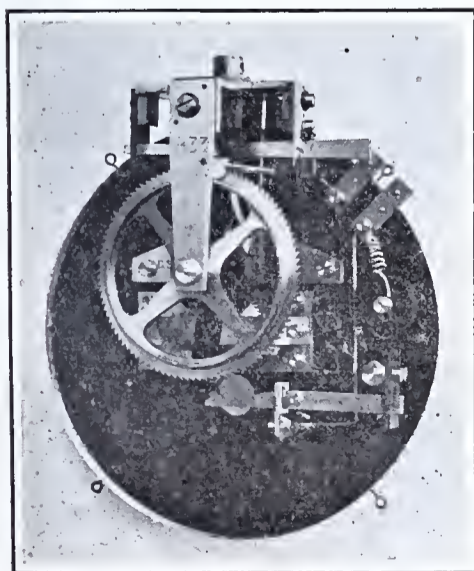


FIG. 2.

most simple way (FIG. 2) and containing an escapement wheel, a seconds hand and minute-wheel. By virtue of the simple construction of the parts, the consumption of energy and, ac-

"WIRELESS telegraphy is to be employed to aid in saving the forests of the West," says *Electricity*. "Plans are being made in the Bureau of Forestry to establish wireless stations at intervals throughout the Rocky Mountains where there are large forests, and where fires occur in the dry season every year, destroying vast areas of magnificent timber. At these stations expert observers will be kept who will give warning whenever a fire begins, and help will be called to assist in extinguishing it. The first system to be set in operation will be in the Black Hills."

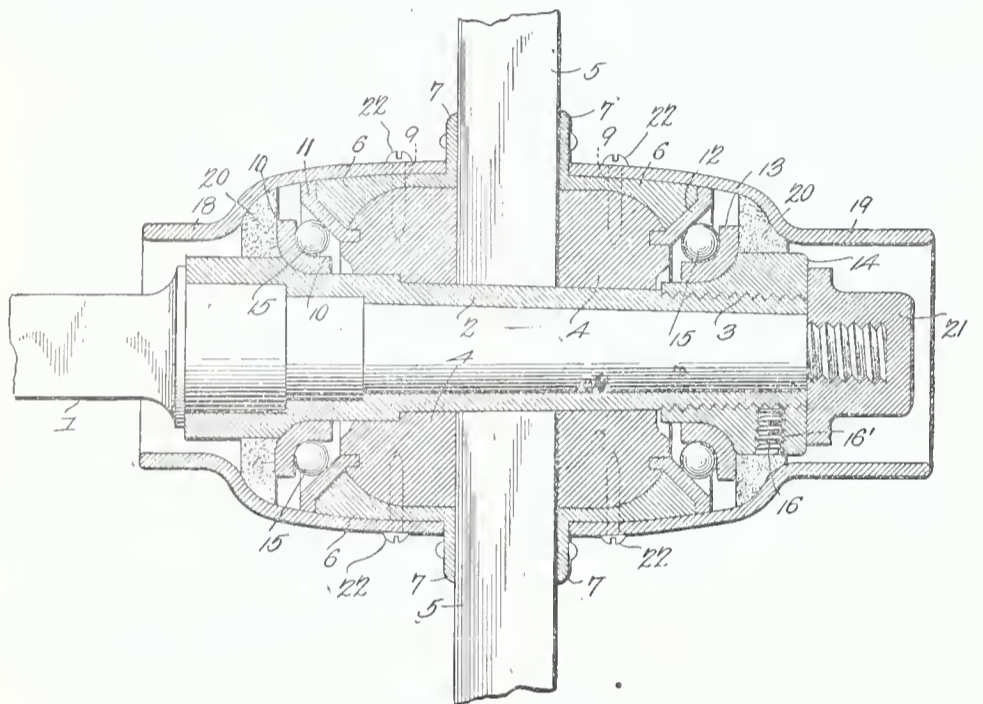
STATIONARY BICYCLE RACE.—Bicycle races without leaving the starting-place, which are said to be the latest craze in places of amusement in Paris, are described in *Popular Mechanics*. Says this paper: "The wheel is fixed in a frame. When the rider begins to pedal, a belt from the rear wheel drives a small electric generator. The current thus produced is conducted to a motor on wheels carrying a flag. The track is marked in distances, and each foot of track requires as much work by the rider as would have carried the bicycle one mile had it been free to run as under ordinary conditions."

CLEVER NEW PATENTS.

BALL BEARING.—RAILWAY RAIL FASTENER.—GRASS CATCHER FOR LAWN MOWERS.—WIRE STRETCHER.

Ball Bearing.

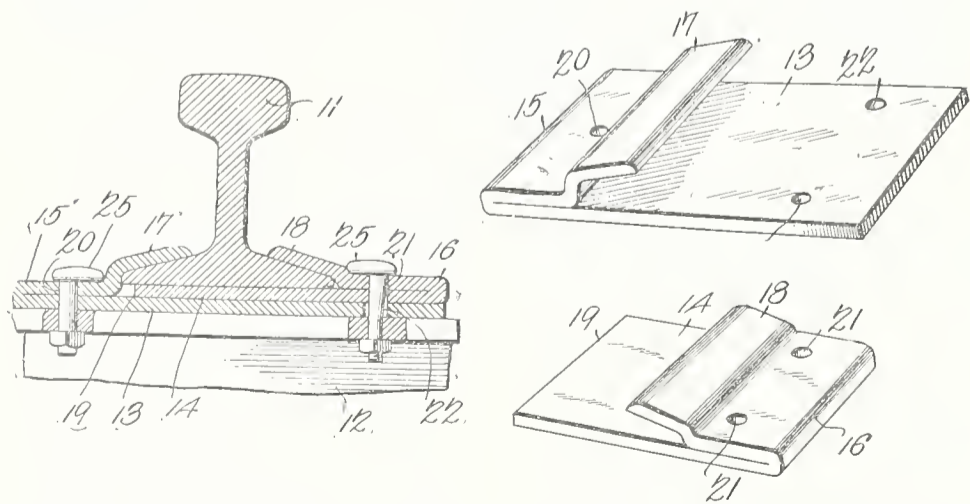
The object of Mr. William H. Makutchan, of Princeton, Ill., is to provide a ball-bearing vehicle wheel, which is adapted for use upon axles of the ordinary type, without any modification of the axle, which may be put on, and removed from the axle as an entirety, without any alteration of the adjustable parts of the bearing, and which will effectively exclude moisture and grit from the bearing, the structure being simple and adapted to remain in adjustment indefinitely. The wheel hub has a body portion provided with annular recesses in the ends, while a casing is arranged upon the body portion of the hub. Cones are seated in the annular recesses, and a box, extending through the hub, has its outer end threaded to receive an adjusting nut. An inner ball cup is located on the box, and an outer ball cup is placed upon the nut, both of these cups being provided with shoulders. Balls are interposed between the cups and cones, and felt washers, secured in the ends of the hub, serve to exclude all dirt and dust.



It will be seen from the forgoing description that the parts of the ball-bearing wheel may be readily assembled and disassembled; that only one adjustment is necessary to bring the balls, cones, and cups into proper relation; and that when the parts have been adjusted they may be readily kept in proper relation by means of set-screw 16, which will, if brought into firm engagement with the box, prevent any movement of the nut 14 thereon. It will also be seen that the felt washers or packing-rings form, together with the hub-bands and casing, an effective protection of the bearings from moisture and other foreign substances which would injure the bearings if allowed to enter.

Railway Rail Fastener.

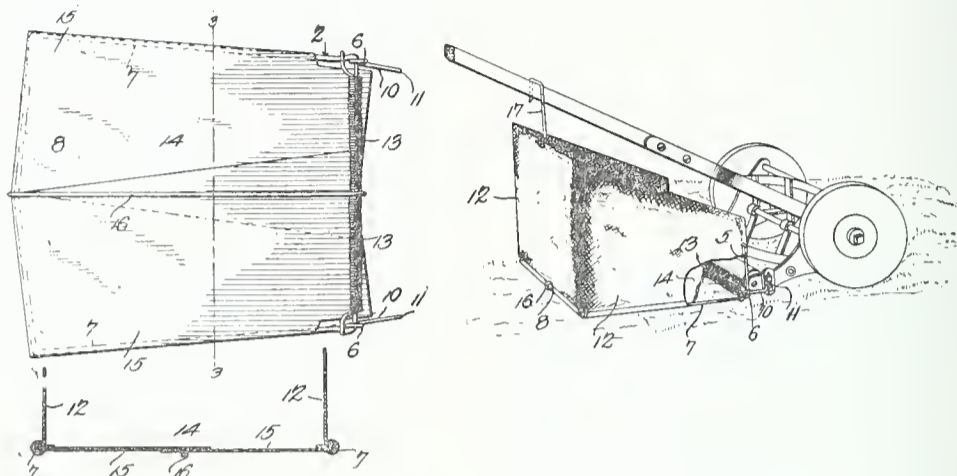
A combined railway rail chair and fastener has been patented by Mr. Charles G. Chamberlain, of Pacific Grove, Cal. The device consists of superimposed plates of unequal length, adapted to be inserted between the rail and tie, and provided respectively with clamping lugs that are arranged to engage with the opposite base flanges of the rail. These lugs have spike apertures, those of one set being disposed partially in advance of those of



the other. The holding spikes employed in connection with the plates taper inwardly towards the points so that when they are forced through the apertures, the shorter plate will be moved over the longer plate, and the clamping lugs thus forcibly compressed against the base flanges of the rail. The device as thus constructed prevents the rail wearing the tie, and furthermore provides sufficient resistance to obviate any danger of the rails spreading. This is owing to the plates 14, which are disposed at the outer sides of the rails, and are provided with two or more of the spike-apertures 21, as shown, to provide the requisite resistance to prevent spreading of the rails.

Grass Catcher for Lawn Mowers.

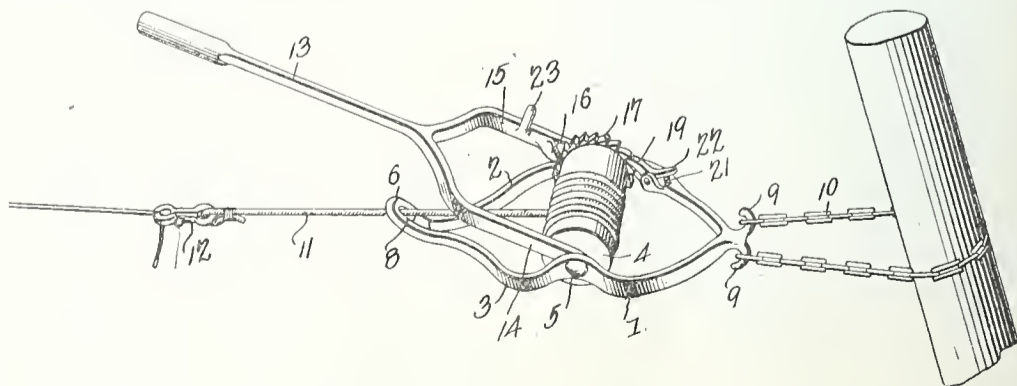
While grass catchers for lawn mowers have been patented, the illustrated device of Mr. La Fayette Wildermuth, of Columbus, Ohio, is thought to be superior in many respects. In 1902, Mr. Wildermuth patented a device of this character, and recently he has obtained another patent on improvements designed to overcome certain objections to the original structure. In the improved grass catcher, a basket is employed, adapted to be secured at its lower front end to the rear portion of the mower frame by suitable means, and having a supporting hook at its upper end that engages over the handle of the mower. The side walls of the basket consist of fabric or other flexible material supported on a frame, while the bottom is formed of sheet metal sections, the



inner margins of which overlap. The sections composing the bottom are at their forward ends entirely free from connection with the frame and from connection with each other along their inner side edges, which overlap at the transverse center of the receptacle. The overlapping edges of the sections are cut upon an outward incline from their rear to their front ends, whereby the latter are rendered considerably wider than the former, and the amount of overlap of the sections is greatest at the front and gradually decreases toward the rear, thus permitting the receptacle to be distended to the fullest extent at its front end without spreading said sections sufficiently to cause an opening between them. It is to be noted in this connection that the overlapping edges of the sections are disposed to relative sliding movement one above the other; and that the bottom will, as a whole, at all times be free from sagging under the weight of the load; but in order to further insure this and to support the sections to a certain extent at the point of overlapping, there is provided a longitudinal brace 16, disposed at the transverse center of the bottom frame in position for the free edges of the sections to rest thereon, said brace being in the form of a length of wire having its ends engaged with the rear bar 8 and spring 13. By this construction a firm bottom is provided that will not sag under the weight of the grass collected, and yet the structure may be varied in width so that the same may be applied to mowers of different sizes. The catcher can be manufactured as a complete article, and can be applied by the purchaser to any well known make of lawn mower.

Wire Stretcher.

A simple and a thoroughly efficient wire stretcher has been patented by Mr. John H. Heisey, a well known resident of Monticello, Iowa. The device is an improvement on a former implement of this character patented by Mr. Heisey in 1898, and involves the following novel combination of elements. An open frame is provided having a drum rotatably mounted therein. A cable is carried by the drum and is provided with a wire-engaging device, the cable being adapted to be wrapped upon the drum when the same is rotated. A drum-operating lever has bifurcated ends forming arms which are journaled on the axle of the drum and one of which is provided with a slot which receives the axle. An internal pawl formed on the slotted arm is adapted to be moved into and out of engagement with the teeth of a ratchet carried by the drum. A



check pawl also engages the teeth to prevent backward rotation of the drum, and this pawl has a spring-pressed finger arranged to be engaged by another finger carried by the arm of the lever, so that upon the abnormal movement of the lever, the chuck will be disengaged from the ratchet to permit the retrograde rotation of the drum, after the wire has been tightened and secured.

SOLID AIR.

THE latest scientific accomplishment is the solidifying of air. Liquid air was enough of a wonder, but now we have gone one step farther, and can transform the atmosphere into something so tangible and solid that one might conceive of grasping a chunk of air and hurling it through itself—so to speak. But apart from the humor of the idea, the importance of the discovery can hardly be over-estimated. Professor Metz, who has for some time been experimenting with liquid air in the Tulane University, Louisiana, several years ago made the new discovery, and has since then been quietly making other observations.

Solid air looks very much like a block of ordinary ice. It is transparent, and has veins running through it, like ice that has been subjected to heavy pressure. It is unlike ice, however, in its remarkable toughness. Professor Metz has tried with every means at his command to smash a piece of solid air about the size of a walnut. He used all his strength with a sledge hammer, but the chunk of air remained intact, and the hammer rebounded as though it had struck a rubber cushion. The average hammer rebounds from solid air as a boy's rubber ball rebounds from the ground.

The Professor has also failed to discover the temperature of solid air. It is almost inconceivably cold—much colder than liquid air. It is estimated that it would register 320 degrees below zero, if a thermometer were made that could record such a temperature.

Another peculiar characteristic of the substance is its enormous attractive power. Anything that touches it sticks to it. If a blow from a hammer is delivered slowly, the tool will remain firmly attached to the air. It requires a sharply dealt blow of great force to counteract this attraction and secure the rebound.

Solid air, according to tests, has a highly explosive power, and there is no doubt that it will play a most important part in warfare before many years have passed. Its force of penetration is almost indescribable, and as it can be managed and controlled much more easily than liquid air—which boils away very quickly—its field of usefulness will be far broader. The solid substance practically paralyzes everything with which it comes into contact.

It is interesting to note how Professor Metz came upon this discovery. It is a well known law that rapid evaporation causes a marked lowering in temperature. When it was announced to the world that liquid air had been discovered, and that it was so cold that it would boil by reflex action on being brought into contact with ice, the professor saw at once that if air could be solidified, a still more intensified coldness could be secured. He prepared an apparatus to evaporate liquid air in the shortest possible time. This apparatus, which is ingenious though simple, consists simply of a test tube and a bent glass tube connecting the test tube with a vacuum. Its purpose is to create a

vacuum over the surface of the liquid to be evaporated. The professor first used the test tube—eighteen inches long and a little more than an inch in diameter—filling it with liquid air to within about six inches of its top. Then he corked it and connected it with the vacuum apparatus by a bent glass tube which he forced through the cork.

The liquid air stood at a temperature of over 300 degrees below zero. As soon as connection was made with the vacuum, a startling disturbance began to manifest itself. The liquid air commenced to sizzle and bubble as water does when exposed to great heat. Soon the cold became so intense that the atmosphere outside the tube condensed and drops ran down the tube onto the table, just as they do from a glass of ice water in summer. In a few minutes the liquid air became solid, and bore the appearance of a fairly clear chunk of ice.

The experiment was obviously a success, but the glass tube broke and the temperature of the whole room dropped to an alarming extent. It became so cold that the professor, who was eager to examine the new substance, found difficulty in continuing his observations. For later experiments, a pair of pincers were provided with which to handle the solid air—as the flesh, if touched by it, is burned as though with red hot steel. When the professor approached the chunk with the pincers, they were attracted to it as a needle by a magnet. With a snap they attached themselves to the side of the substance, and it was only by much exertion that they were freed. This attractive power, it has been suggested, may be the same as that in operation at the north pole.

A steel rod, a foot long, held in the hand and applied to the block of air, conveys to the hand a sensation of tremendous heat so great that one does not know whether it is heat or cold. It is impossible to hold the position for more than a moment, a sense of paralysis coming over the entire body.

As for practical results, it is believed that solid air can be made extremely useful to coal miners. Frequently, noxious gases prevent working a mine in sections, and enormous loss of material and time results. The same difficulty is met in long tunnels, and the engineers in charge of the 12-mile Simplon tunnel, now being cut from Switzerland into Italy, have placed themselves in the front rank of scientific operation by using liquid air for blasting, instead of dynamite. But the solid form of air, as already noted, is much more available. A cylinder charged with this substance will send its power outward, as from the mouth of a cannon, cutting through the earth or the strata of coal, and at the same time, giving off almost pure oxygen, thus clearing the atmosphere and allowing the men to work as soon as the destructive process is complete.

But it is in war that the possibilities of the new substance are most amazing. Professor Metz believes that if he can suddenly turn the solid air into gaseous atmosphere, he will create an explosive in comparison with which dynamite would be like a fire cracker. Probably no substance, put together by man, could be proof against such an irresistible force. In short, radium does not promise more wonders to the world of science than does this last discovery.

IMPORTANT COURT DECISIONS

DECISIONS OF THE U. S. COURTS.

Court of Appeals of the District of Columbia.

ALLEN, COMMISSIONER OF PATENTS, *v.* THE UNITED STATES, *EX RELATIONE* THE REGINA MUSIC BOX COMPANY, A CORPORATION.

Decided June 25, 1903.

1. MANDAMUS—LABEL REGISTRATION.

A mandamus does not lie to compel the Commissioner of Patents to register in the Patent Office an alleged label which in his opinion is not a label as defined by the statute.

2. SAME—SAME—COMMISSIONER OF PATENTS VESTED WITH DISCRETION.

Section 3 of the act of June 18, 1874, imposes upon the Commissioner of Patents the duty of determining whether or not the thing presented for registration is a label as defined by the statute, and his decision whether right or wrong is not subject to control by mandamus.

2. SAME—PUBLIC OFFICER—DISCRETION NOT CONTROLLED BY MANDAMUS.

Where an officer has jurisdiction to decide at all, he necessarily has jurisdiction and it is his duty to decide as he thinks the law is, and the courts have no power whatever to review his determination by mandamus or injunction.

Supreme Court of the United States.

LA REPUBLIQUE FRANCAISE *et al v.* SARATOGA VICHY SPRING COMPANY.

Decided December 7, 1903.

1. TRADE MARKS—"VICHY"—GENERIC WORD.

The word "Vichy" has by use become generic and indicative of the character of the water and cannot be regarded as a trade-mark.

2. SAME—SAME—LACHES OF PLAINTIFF—DESCRIPTIVE WORD.

Held that the owners of the French Vichy springs have no exclusive right to the use of the word "Vichy," since for the past thirty years they have permitted others to use that word in trade

upon various waters, both natural and manufactured, having some similarity to that of the French springs, and therefore the word has become descriptive.

3. SAME—GEOGRAPHICAL NAMES—SECONDARY SIGNIFICANCE.

Geographical names often acquire a secondary signification indicative not only of the place of manufacture or production, but of the name of the manufacturer or producer and the excellence of the thing manufactured or produced, which enables the owner to assert exclusive right to such name as against every one not doing business within the same geographical limits, and even against them if the name be used fraudulently for the purpose of misleading buyers as to the actual origin of the thing produced or of palming off the productions of one person as those of another.

4. SAME—SAME—SUIT ON BEHALF OF INDIVIDUAL—LACHES.

Where the Government is suing for the use and benefit of an individual or for the prosecution of a private and proprietary instead of a public or government right, the ordinary rule of laches applies in full force.

5. SAME—GOVERNMENT NOMINAL PARTY LACHES.

Where the French Republic is nominally the plaintiff, but the real party in interest is a company leasing the springs from the Republic, *Held* that the laches of that company is sufficient to prevent granting the relief sought.

COMMISSIONER'S DECISION.

EX PARTE HALL AND FRASER

Decided May 6, 1903.

1. DIVISION—PUMP, GEAR WHEEL, AND LUBRICATING DEVICE.

Held that division was properly required between claims to the general construction of a pump and claims to a gear-wheel having a particular construction of bearing and lubricating device.

2. SAME—COMBINATION AND SUBCOMBINATION.

Division may be required between claims to the general combination and claims to a subcombination where it is apparent that the subcombination is a separate and independent invention from the general combination.

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MECHANICAL INVENTIONS AND DESIGNS

Patents for which have been procured
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Washington, D. C.

Frank Bosch, Crescent City, Cal.
Vehicle.—The object of this invention is to provide an improved standard for the support of each spring member of the running gear, and to permit a free vertical swinging movement of the springs. It also provides an improved coupling device for connecting the lower ends of the springs to the bed or body of the vehicle in order that the springs may have the desired lateral play.

Benjamin F. Mohr, Mifflinburg, Pa.
Drilling Machine.—This machine includes a screw feed for the drill spindle and novel mechanism which, while permitting the reversal of the feed by hand, will automatically reverse the feed after a given movement of the spindle. Another feature includes means actuated by the drill operating handle or crank to stop the feed at any desired point, and to inaugurate a comparatively rapid return movement of the drill, which movement is reversed to again restore the positive feed of the drill, by means of adjustable trip mechanism which can be set to arrest the return movement and recommence the feed, when the drill spindle has reached any desired elevation.

Mathias Hofmann, Knightsville, Ind. Weighing Machine.—This invention relates to weighing machines of that character employing a scale-supported receptacle, within which there is arranged a partition or valve that constitutes a partial support for the materials placed in the receptacle, and is arranged to swing with relation to a feed hopper when a determinate amount of material has been placed within the receptacle. The principal object of this invention is to provide a simple structure which will be accurate without regard to the amount of material that is in the receptacle, and wherein the weight of the material against the partition will not be converted by the holding means thereof into a downward thrust upon the receptacle until such receptacle has moved from its initial position. A suitable supporting frame is employed, upon the upper end of which is mounted the hopper. A scale is pivotally mounted upon the support, and from the scale is suspended an open-ended receptacle arranged below the hopper. A partition pivotally hung between its ends within the receptacle has its upper end coacting with the opposite walls of the hopper, while its lower end is movable across the bottom of the receptacle. Links are pivoted to the hopper and to the partition, and these links, when the receptacle is elevated, are arranged in horizontal position so that the thrust of the grain or material placed in the receptacle and bearing against the partition will not exert a downward pressure upon the receptacle.

Edward D. Carter, Brenham, Texas. Cotton Condenser and Cotton Compress. Two patents.—The cotton condenser is designed to take the lint from a battery of gins, and to form and deliver a composite bat suitable for immediate baling. Located obstructively in a flue common to a plurality of gins are three condensing cylinders arranged one above another, each cylinder opening at one end into a dust flue, which latter is also extended across the top of the upper cylinder. Disposed in adjacent relation to the cylinders, at the side of the series re-

mote from the gins, is an endless bat former which doffs the lint from the upper cylinder and combines it successively with the lint from the lower cylinders. The composite bat thus formed is passed between a pair of compressing rolls, which condense the bat and deliver it from the condenser in a condition to be immediately baled. While there are many advantages claimed for this construction, the most prominent are the total elimination of doffers which are apt to become clogged in operation, the absence of any obstruction to the free passage of air through the condenser cylinders, and the production of a bat which, when delivered, does not require further compression before being delivered to the press.

The second patent discloses a baling press, the operation of which is entirely novel. This press is designed to form cylindrical bales from a bat fed continuously from a condenser. The bat is first wound in cylindrical form between a compression roll and an endless belt, and as it increases in size, the belt, which is passed around rollers mounted on a traveling carriage, gradually recedes against the resistance opposed to such recession by suitable pressure mechanism. In addition to the compression roll in contact with which the bale is initiated, the press is equipped with a large primary roll, which co-operates with the belt after the bale has attained considerable proportions. In addition to the two bodily movable rolls, located within the endless belt is a third roll which, during the formation of a bale, maintains its position and thus causes the bight or loop of the belt in contact with the bale to increase in size with the increase of the bale, so that the latter cannot possibly flatten or distort under the pressure applied thereto. When the bale is completed, this upper roller in the belt is dropped to permit the removal of the bale, during which delivery a take-up mechanism cares for the bat being fed to the press, and subsequently delivers the accumulation for the initiation of another bale, as soon as the parts of the press have been restored to their normal positions.

Wm R. Colman, Quincy, Ill. Baling Presses. Three patents.—The first patent is directed particularly to a novel form of feeding mechanism for the press. This mechanism is operated by the pitman during a portion only of the stroke in opposite directions, so that the hopper and feed throat of the press will be open for the reception of hay or other material during the major portion of the plunger stroke. The device includes a feeder-operating cam, carried by a bracket mounted on the reach or power sill, a roller carried by the pitman and engaging the cam, an oscillatory feeder normally closing the end of the hopper and arranged to move down into the press box to force the hay therein, a bell-crank multiplying lever located at one side of the press box, and connections between the lever and the cam and between the cam and feeder respectively, whereby the feeder will be operated at the proper time.

The second patent is also directed to the improvement of the feeding mechanism. An oscillatory feeder is arranged to be intermittently operated through the medium of a trip arm disposed in the path of the pitman head, the arrangement being such that the feeder will be projected and retracted even more quickly than in the first construction. This feeder is so arranged that it will retain its vertical position during its movement into the press box to pack the hay, mechanism being provided for automatically changing the angular disposition of the head with respect to the swinging arms of the feeder as the latter move downward. This feeding mechanism is not only simple in construction and effective in operation, but is adapted

for application to presses already in use, and is incapable of being broken or deranged when the press is operated in a reverse or backward direction.

The third patent discloses a novel form of power mechanism for operating the press plunger. The primary object is said to be to secure a comparatively long stroke of the plunger, a large feed opening, and an extended dwell of the plunger at the limit of its retractile movement, whereby the operator is enabled to feed a complete charge of material to the press box before the plunger advances. This mechanism includes a drawbar located at one side of the pitman and having link connection therewith, a rotary double-ended power head engaging the drawbar and the side face of the pitman during the initial movement of the latter, and arranged to engage the end face of the pitman during its final movement, and a swinging guide arranged to engage the pitman to compel sufficient lateral movement thereof to prevent the premature disengagement of the pitman and power head during the plunger stroke.

James H. McDaniel, Millsap, Texas. Combined Seed Planter and Fertilizer Distributer. Two patents.—One of these patents discloses a planter and distributer which is adapted for strewing or for check row planting, with or without a wire, and embodying means whereby it will simultaneously distribute the fertilizer, regardless of the manner in which the planting mechanism is operated. Upon a suitable wheeled frame are mounted the seed and fertilizer boxes, containing mechanism for properly feeding the fertilizer and seeds to the shoes. The fertilizer feeding devices are driven from the carrying wheels of the apparatus, and the seed dropping mechanism is arranged to be actuated by a shaft extending transversely across the frame and adapted to be operated either from the check wire, when the latter is employed, or from the carrying wheels when the machine is used as a wireless planter. The seed feeding mechanism is so constructed that by the removal of an element thereof the seeds may be strewn instead of being deposited in hills. The first patent covers a number of features of the planter, including the check wire operating mechanism, and the second patent covers the mechanism whereby the feeding devices are operated from the carrying wheels.

Lloyd C. Glisson, Statesboro, Ga. Fire Shield and Soda Water Faucets. Three patents.—The first patent covers an invention in fire shields, designed to constitute part of the equipment of fire-fighting departments. The shield is constructed of sheet metal sections that are telescoped and can be raised to any height desired, being hollow to permit the free passage of air therethrough, and thereby to prevent the passage of heat. In use, the shields are transported in collapsible condition to the fire, and are placed between the burning building and others adjacent, which it is desired to protect. A plurality of these shields can be placed side by side and securely supported so that they will constitute a fire-proof wall, that will protect the property surrounding a conflagration.

The other two patents relate more particularly to faucets and are designed for use in connection with syrup tanks of soda water dispensing apparatus. The object is to provide a simple vessel by means of which any desired amount of syrup may be accurately measured. In the original form of the invention, a casing is employed having an upper inlet nipple adapted to be attached to a syrup reservoir and having a lower discharge opening. Within the casing is rotatably mounted a measuring

receptacle having an opening arranged to align with either the inlet or outlet of the casing. This receptacle has an exposed handle, and through the same passes a rotatable stem having a screw at its inner end that has a threaded engagement with a plunger. Thus, by rotating the stem, the plunger can be moved back and forth in order to vary the amount of syrup admitted to the receptacle and discharged therefrom. This amount is indicated by a suitable pointer connected with the plunger.

The later patent is along the same lines and is intended for the same purpose. Substantially the same casing and receptacle are employed. A plunger is slidably mounted in the receptacle, and this plunger is rigidly connected to a sliding stem having an exposed handle that also constitutes means for turning the receptacle. A spring mounted on the stem between the plunger and the outer end of the receptacle serves to always maintain the plunger in its innermost position, and thus when the plunger is drawn outwardly, will return the same and expel the syrup.

Dr. Henry W. Howe, City of Mexico, Mexico. Three patents. Fishing Reel, Camera, and Car Fender.—The first of these patents discloses a fishing reel equipped with an automatic drag which resists the rotation of the reel in one direction to prevent the over-running and tangling of the line, and is automatically released when the reel is rotated in the opposite direction to wind in the line. The drag is also provided with means whereby it may be held inoperative by the angler to permit free running of the line, as for instance, in casting, or when it is desired to impose a drag upon the reel for the purpose of playing and breaking down the fish. The reel also includes a manually-operated brake for stopping the reel entirely, or for imposing a greater resistance than is opposed by the drag.

The second patent discloses a simple device designed to be used in connection with any well known form of hand camera for expeditiously making instantaneous exposures of moving objects so that the images of said objects will be properly centered upon the plates or films. In the preferred embodiment of the invention a substantially gun-shaped support is employed, comprising a stock, a grip and a barrel portion. To the barrel portion is adapted to be attached, by suitable means, the camera. A trigger pivoted upon the grip has an arm extended along the barrel, and provided with an offset adapted to engage the usual shutter controlling button. In using the device, the camera is first prepared in the ordinary manner, and the support is aimed at the object to be photographed, whereupon the trigger is pulled, thus releasing the shutter and making an exposure.

The third patent discloses a novel car fender, the primary object of which is to shove the would-be victim of an accident to one side or the other, out of the path of the car. At the front of the car is mounted a fender arranged to rotate on a vertical axis, and having a novel buffer rail so disposed that when a person is struck the fender will swing sidewise, so that, instead of throwing the person in front of the car, he will be brushed aside. Mounted in the hub of the fender are counter-active springs, which, while permitting the fender to swing sidewise in the manner stated, automatically restore it to its normal position when released from the object struck. A novel form of bracket is associated with the fender to permit the attachment of the latter to the car, and at the under side of the buffer rail are mounted anti-frictional contact balls, which project below the rail and are designed to prevent the fender from catching on projecting portions of the paving.



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FOR SALE.—Patent No. 762,179, issued June 7, 1904. Foot Rest Attachment for Radiators. Simple, cheap, durable and ornamental. Sells itself. Fits any radiator. Always warm. A great boon for cold feet. For terms address, Dr. F. H. Maxam, Princeton, Ind. nov

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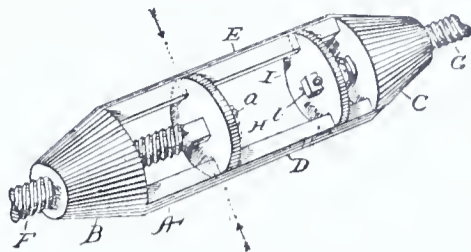
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Correspondence with inventors, mechanics, patentees, and manufacturers, is invited. The columns of this journal are open for the discussion of such subjects as are of general interest to its readers.

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THE FUTILITY OF MANDAMUS PETITIONS.

The case of Allen, Commissioner of Patents, *v.* The United States, ex Relatione The Regina Music Box Company, a corporation, reported in another part of the AGE, is interesting as showing the disinclination on the part of courts to grant a mandamus, except in a very plain case.

It appears that the Regina Music Box Company filed an application for the registration of a label. The latter was rectangular in outline and represented an ornamental design surrounding a blank space, oval in form, in which appeared the word "Regina" printed in large letters. In the accompanying description, it was declared to be "a label to be used for music-boxes;" but there was nothing on the face of the representation, itself, to indicate a limitation to that particular use.

The Examiner of Trade-Marks was of the opinion that the representation was not a label within the meaning of the statute, because not descriptive of the article upon which it was intended to be used, and therefore denied its registration. An appeal was taken to the Commissioner of Patents, who agreed with the Examiner that the representation was not a label, but was of the nature of a trade-mark, and affirmed his decision.

A petition for mandamus was filed in the Supreme Court of the District of Columbia, and granted. An appeal was taken by the Commissioner of Patents to the Court of Appeals of the District of Columbia, and that tribunal reversed the judgment of the lower court, and remanded the case with instructions to dismiss the petition. The Court said:

"We are not prepared to say that the statute imposing the duty in this case requires the performance of a simple ministerial act, and is so plain in its terms as to admit of no room for construction. The Commissioner was called upon to decide whether the thing presented for registration was,

or was not, a label as defined by the statute."

The Court then quoted the decision of the U. S. Supreme Court in *U. S. v. Hitchcock*, 190 U. S., in which it was held:

"Whether he decided right or wrong, is not the question. Having jurisdiction to decide at all, he had necessarily jurisdiction, and it was his duty to decide as he thought the law was, and the courts have no power whatever under those circumstances to review his determination by mandamus or injunction."

Attorneys practicing before the Patent Office have attempted in vain by mandamus to obtain the judgment of the courts in trade-mark and label matters, which are under the jurisdiction of the Patent Office and from whose decision no appeal lies under the law. A series of petitions for mandamus have been filed in the courts of the District of Columbia, beginning with the case of the State of South Carolina *vs.* Seymour; but in every instance the courts have refused to interfere, holding that since the Commissioner had jurisdiction to decide the question, his decision cannot be reviewed by mandamus, and that the statute, having failed to provide a right of appeal, cannot be overridden by the courts in taking appellate jurisdiction through a writ of mandamus.

It seems plain that applicants for registration should have the right of appeal from the decision of the Patent Office to the courts, and it is gratifying to know that the bill now before Congress to amend the trade-mark laws provides for an appeal to the Court of Appeals of the District of Columbia. The passage of the bill should be strongly urged by members of the bar at the coming session of Congress, to the end that the privilege of an appeal to the courts may be secured as a matter of right.

AN IMPORTANT TRADE MARK DECISION.

A decision of uncommon interest has been rendered by the Supreme Court of the United States, and a syllabus of the same is printed in another portion of the AGE.

The suit was brought to vindicate the right of the plaintiffs to the exclusive use of the word "Vichy" as against the defendant, and incidentally as against all persons making use of the word to denote a water not drawn from the springs of Vichy, now owned by the French Republic and leased to the La Compagnie Fermiere de l'Etablissement Thermal de Vichy.

The title of the French Republic to the springs of Vichy, a commune of France, is clearly established. Known for their medicinal qualities since the time of the Roman Empire and originally belonging to the feudal lord of Vichy, they were sold by him in 1444, together with the castle and its dependencies, to Pierre, Duke of Bourbon, in whose family they remained until 1531, when, for the treason of the Constable of Bourbon, they were confiscated by Francis I, and became the property of the Crown, in whose possession they remained until 1790, when they were united to the public domain and afterward passed to the French Republic and its suc-

cessors, and were operated directly by the officers of the state until June, 1853, when they were leased for a fixed rental to a firm of which the aforesaid company is the successor. The bottling and exportation of the waters commenced before 1716, and in 1853 they began to be exported directly to this country, the shipments in 1893 amounting to about 300,000 bottles. For many years they have been bottled and sold all over the world.

The rights of the defendant originated from a spring discovered in 1872 in the township of Saratoga Springs, N. Y., the waters of which, though differing from the water of the Vichy spring both in ingredients and taste, have a certain resemblance to them which suggested the use of the word "Vichy." The water began to be bottled and sold in 1873 by the owners of the spring, and in 1876 became the property of the defendant, which has since sold the water, using various bottles, circulars and labels, containing more or less conspicuously displayed the word "Vichy."

As the waters of Vichy have been known for centuries under that name, there is reason for saying that the plaintiffs had in 1872 acquired an exclusive right to the use of the word "Vichy" as against every one whose waters were not drawn from the springs of Vichy; but a serious difficulty in the way of enforcing at this late day an exclusive right on the part of the plaintiffs to the use of the word "Vichy," is their apparent acquiescence in such use by others. For thirty years the defendant had been openly and notoriously selling its waters under the name of the "Saratoga Vichy." Furthermore, other waters were openly manufactured and sold in this country under the name of "Vichy," nearly every soda-water fountain dealing out a manufactured water having that name. In view of these facts the Court held that the owners of the French Vichy Springs had no exclusive right to the use of the word "Vichy," as they had allowed the name to become generic and indicative of the character of the water, and said: "A clearer case of laches could hardly exist."

The plaintiffs attempted to defend their position on the ground that the doctrine of laches has no application to the neglect of a Government to pursue trespasses upon its rights, and that the French Republic is entitled to the benefit of that rule. The Court, however, decided, "that the ordinary rule of laches applies in full force."

As a result of this decision, the word "Vichy" is kept open to the use of the public, for it has been declared by the Supreme Court of the United States to be a generic word, indicative of the character of the water, and cannot be regarded as a trade-mark.

To keep themselves posted in the progress of the art in which they are interested, inventors and manufacturers should subscribe for the INVENTIVE AGE, which publishes a list of all patents issued each month. The low subscription price and the character of the publication, entitle it to the support of all the inventors of the country.

OUR PREMIUM OFFERS.

The attention of the readers of our paper is invited to the advertising columns, wherein will be found a number of premium offers which are worthy of careful consideration.

It is becoming the custom now for all journals to offer premiums for subscriptions. The offer of a premium by a newspaper does not indicate that the value of the paper has become depreciated, but it simply means that the proprietor has obtained control of certain books or articles of commercial value at a low price, and is able and willing to offer them at cost as an inducement to new subscribers. The premiums offered by the AGE are not excelled by any paper or magazine.

First and foremost, is the Post self-filling and self-cleaning fountain pen. There are fountain pens offered as premiums, but not one of them can compare with the Post pen in its self-cleaning and self-filling features. It is the only pen manufactured having these conveniences. The pen has a gold nib and is furnished in either fine, medium, or stub points. It makes an excellent Christmas present, and will be sent to any address postpaid. The Post fountain pen sells in New York City for \$3, but we are able to forward it to any subscriber for \$2, which will include a year's subscription to the INVENTIVE AGE. The pen will not be sold alone.

Next in importance is the offer of "Webster's Dictionary, and a subscription to the AGE for \$2.75. Every home should have a dictionary, and Webster's is the standard. It has never been possible, heretofore, to obtain a Webster's Dictionary for less than \$9; therefore, the offer of the AGE is unprecedented. The illustration given of the dictionary in the advertisement is a faithful reproduction of the same.

Anyone interested in mechanics, whether he is an inventor or artisan, would like a copy of "Appleton's Cyclopedia of Applied Mechanic." This work has, heretofore, never been sold for less than \$22.50. We are able to furnish it to the readers of our paper for \$12. As the offer is likely to be withdrawn at any time, those who want this valuable set of books should write at once.

There are a number of women's journals on the market, but none has the circulation or the standing of the "Woman's Home Companion." It is printed on finished paper, has from forty-four to sixty large pages, and the twelve numbers during the year will contain more than 1,000 illustrations. It is altogether the cleanest, prettiest, choicest, and best of the American home magazines. It is just the thing to make your wife happy. The subscription price to the "Woman's Home Companion" is \$1 per year, but we are able to offer the INVENTIVE AGE, and the "Woman's Home Companion" for \$1.25. We can send the AGE to one address, and the "Woman's Home Companion" to another. Further particulars can be obtained by reading the advertisement.

THE PATENT OFFICE.

The condition of work in the Patent Office is not improving, but on the contrary, is gradually retrograding. According to the report furnished by the examining divisions to the Commissioner of Patents under date of September 27, 1904, there were 14,435 cases awaiting official action, a larger total than at any time we can recall. One of the divisions of the Patent Office has 760 applications awaiting action; and most of them have several hundred under consideration. One of the divisions is between four and five months behind, and by far the greater number are from one to three months. There was a time when the work had been brought up to one month, but there seems to be no prospect of returning to such conditions. Something should be done to remedy the situation. The Patent Office force will have to be materially increased, and a strong effort will be made by the proper authorities to obtain an increase in the force this winter. The plan of increasing the working hours has not produced any results; on the contrary, we do not believe that there is as much work done now as when the hours were shorter.

The work of examining applications for patents is so laborious and wearing on one's nerves, that it cannot be kept up continuously for as long a time as ordinary clerical work. A man may work at book-keeping, or attend to the ordinary clerical work in the departments for eight hours without discomfort; but if he had to examine applications for patents, he would find before the eight hours were over that his mental faculties were becoming fagged. No one, who has not had to examine copies of patents day in and day out, week in and week out, year in and year out, can realize the serious strain on one's nerves that accompanies such work. Of course, there are some divisions of the Patent Office where the work is quite light because the inventions are simple; but as a rule a man has to keep his wits about him at all times in order to attend to the business of examining applications for patents.

The number of resignations of examiners continues to be a disturbing factor in the Patent Office. The only way to remedy this is by increasing the pay of the examining officials. There should be an earnest effort made at the coming session of Congress to obtain an increase in the force, as well as an increase in the pay, and those who have the interests of the Patent Office at heart, should prevail on their members of Congress to aid the Patent Office in this matter.

A New Third Rail Railway.

A third rail for electric railways is the subject matter of a patent recently granted to Mr. Albert F. Chase, of Haddonfield, N. J., one-half of which has been assigned to Stanley W. Rusk, of Philadelphia, Pa.

In the embodiment of the invention, the depending portion of the rail has its widest part at the under face thereof, and this width is proportionate to the face of a contact-shoe, intended to receive the propelling current from the rail. The upper part of the depending portion, which is the rail proper, preferably narrows toward the top into a neck-like form, termin-

ating in a flat top from which spread outward on each side two oppositely disposed flanges, from which extend wings, which are preferably straight and incline downward and outward and are of such lengths as to bring their lower ends in or about the same horizontal plane as the base or contact-face of the rail proper. In each of the flanges are bolt holes, drilled vertically through the same, to enable the third-rail conductor to be mounted to the rail-hanger. This construction of third-rail provides a perfect water-shed over the rail proper, and may be made integral therewith, the downwardly-inclined extending wings also protecting the conductor laterally.

Wireless Typewriting.

The commercial world is already familiar with the electric typewriter, through the medium of which telegrams are sent and received; but the application of this apparatus to the wireless system constitutes a distinct novelty. The transmitting machine, in this new device, consists of a disc rotating in synchronism with a similar disc at the receiving station. Electro-magnets on the disc, one for each letter, are controlled by the typewriter keys. Pressing down a key on the transmitter operates a lever which engages with a contact-piece on the rotating disc when the latter is in a certain position. As a result of this contact, the magnet is excited and the letter is printed. At the same instant, an electric impulse is sent into space. This is received by the other instrument, and, the disc on the latter being in a similar position to that on the transmitter, the letter is again printed. A controlling key serves to start or stop the apparatus at the receiving station at the same instant as at the transmitting station. The advantages of the system are obvious in these days when time is reckoned as money. It is believed that with this new instrument, a saving of two-thirds of the time of transmission over that by means of wireless telegraphy may be effected.

The New Bank Notes.

No longer will the Bureau of Engraving and Printing turn out crisp bank notes. Hereafter, our paper money will be soft and velvety, if important experiments which are now being made by Treasury officials to learn the advantages of new chemical treatment for paper prove satisfactory. If the new secret process is adopted, the result will be to revolutionize a portion of the work connected with the printing of Uncle Sam's money. By the new system, it will take just sixty days less time to manufacture a bank note than by the present method. The chemical solution not only renders the paper soft, but also makes it non-shrinkable. By applying it to a Japanese napkin, that article becomes as pliable as a tissue of silk. The chemical preparation also acts as an antiseptic and preservative. When used on old documents, it appears to knit the fiber together and to prevent decay.

Under the present process of print-

ing paper money, the paper is thoroughly soaked in water. While still wet, one side of the paper is printed. This sheet is then placed in a steam room and kept under a high temperature for thirty days, the time necessary for the ink to dry. The sheet is soaked again, and the other side of the bill printed. The thirty-day drying process must then be repeated. In cases where a third impression on the bill is necessary, (which is required when the printing is done in two colors,) the wetting and drying process has to be repeated a third time, thus consuming three months in the production of a single note. Besides the tiresome delay of this process, the wetting and drying rots the fiber of the paper, and although it is subsequently starched to give it the crisp appearance, the starch soon disappears, leaving the bill limp and worn. By the new process, no wetting is required, the ink loses none of its luster when applied to the paper, as under the old method, and is thoroughly dry within 48 hours after the printing is done.

The Widening Use of Electric Welding.

The electric weld is becoming a more and more important factor in many industries. During recent years the extension of its application has been steady, and each year has witnessed its entrance into new fields. Sometimes, indeed, new manufactures, or new ways of obtaining results, have been based upon its use. The electric welds under consideration are the results of that operation of uniting two pieces of metal by what is known as the Thomson process, first brought out and rendered available in commercial practice a considerable number of years ago. The rapidity, flexibility, cleanliness, neatness, accuracy, and economy of the electric process have won for it such an important standing in the arts that many future extensions in its application are assured.

The uniformity of the work, the control of the operation, the extreme localization of the heat to the particular parts to be united, and the fact that the process is not limited to iron and steel, but can deal equally well with other metals, such as copper, brass, bronzes, and even lead, are characteristics of the electric welding operation.

In the wagon and carriage industry, the process is applied in the production of tires of all sections, axles, hub, spoke and sand bands, fifth wheels, shifting rails, steps, shaft iron, etc., while it has found a large use in the welding into continuous strips or bands of the wires inclosed in rubber tires for holding them in place. The larger part of the dash-frames used in carriages in the United States are now probably made by electric welding, while iron and steel agricultural wheels are built up, or have their parts united, by electric welds.

To enumerate the many applications to the bicycle industry would be almost to catalogue most of the metal parts of this useful machine. It must be borne in mind, too, that a welding machine, slightly modified, is equally applicable for locally heating parts in electric brazing or hard soldering, for upsetting, and for bending or shaping.

In the wire industry the part played by electric welding is already quite important, and becomes steadily more so. Besides the mere simple joining of wires of iron, steel or copper into lengths, the welding of wire or strips into hoops for barrels, tubs, pails, etc., is supplanting the older forms. Numerous machines are in operation turning out electrically-welded wire fence, much as a loom turns out cloth. —*Cassier's Magazine.*

A Music Typewriter and Other Novelties.

The evolution of the typewriter, unlike that of most machines, has taken place within the memory of this generation. The first practical typewriter ever constructed was made only as far back as 1846; and although a crude piece of workmanship, capable of being operated only at a ridiculously low rate of speed, it embraced the essential principles of all the modern machines. It was called a "mechanical chirographer," and had the paper carrying roller and machinery for line and letter spacing.

In view of the present enormous demand for this labor saving device, it is hard to realize that only twenty years ago, not more than 1500 typewriters were being manufactured and sold annually. Nowadays, such is the popularity of the machine that a finished article is being produced for every five minutes of the working day by one company alone; and this rate of production is nearly if not quite equaled by scores of other makers. Within the last two decades, there have been invented and placed upon the markets of the world nearly 150 different types of machines—all of the best known ones, with one exception, having been produced in this country. A curious feature of the evolution of this invention is the number of patents taken out on each machine, one, for instance, having some sixty or seventy distinct devices.

There have been many costly and ornamental machines made for notable people; perhaps the most elaborate ever produced was for the Czarina of Russia. All parts of the machine ordinarily black were enameled blue, and those portions of the framework usually outlined in gilt were inlaid with mother-of-pearl. The keys were of ivory and the bright parts of solid gold. Similar *articles de luxe* have been made for the Princess of Wales, the Khedive of Egypt, and the King of England. An extraordinary machine was made for Li Hung Chang—fitted with twenty sets of characters, or 1800 in all, each of which, as no dies were available, had to be turned by hand. Typewriters have been made with Greek and Russian characters—an American firm having recently supplied a large order for government offices in the land of the Czar. Machines have been built to order for writing Arabic, Sanscrit, and even old black letter English; but the most recent novelty is an apparatus that eliminates the tedious work of preparing music for publication.

This music typewriter is very much like other machines in appearance, except that it forms the scale as the operator proceeds, besides registering the characters. It not only marks the notes, bars and rests, but the lines as well. The cost of a music typewriter is \$300, and a company has been organized to put it on the market in considerable numbers. The invention will, of course, reduce the cost of copies of music of limited circulation. The only thing left to be done, it would seem, is to attach the typewriter to a piano, so that as composers improvise, the music will be typewritten simultaneously, and without intruding on the inspired movement.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE. This keeps inventors and manufacturers posted in the art in which they are most interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy; twenty copies \$1.50.—Please give correct data in ordering.—Address,

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 Fence, Wire.....L. Fretz
 Film, Roll.....H. Fritzsche
 Filter.....T. W. Goreau
 Filter.....A. Forbes
 Filter.....H. Marsh
 Fire alarm electric circuit closer.....J. E. Bemiller et al
 Fire engine heater, Steam.....J. G. Mattheis
 Fire extinguisher, Detonating alarm.....M. A. Libbey
 Fire screen, Emergency.....W. M. Conran
 Firearm ejector mechanism.....M. Wirsing
 Firearm single trigger mechanism.....G. E. Witherell
 Fireproofing wood.....J. L. Ferrell
 Flanging implement.....J. P. Sneddon
 Flue, pipe, &c. scraper and cleaner G. K. Wells
 Fluid indicator.....J. F. Metton
 Fluids, &c. Apparatus for automatic delivery
 of.....E. W. Lindgren
 Fly screen.....H. W. Peignat
 Fob, charm, or locket.....H. F. W. & H. F. Schlecker
 Friction spring.....P. Hein
 Fruit package, Knockdown.....E. L. Walker
 Fruit picker.....S. H. Kuhn
 Furnace.....L. Dietz
 Furnace.....W. E. Walsh
 Furnace door opener, Automatic.....W. Gowin
 Furnace for steam generators, &c.....W. H. Longsdorf
 Fuse, Percussion.....D. J. Cartwright
 Fuse post, Self-soldering.....C. R. Pirat
 Garment fastener.....H. S. Pullman
 Gas apparatus, Acetylene.....A. W. Cram
 Gas burner.....F. W. Rath
 Gas engine.....A. S. Dickson
 Gas holder.....T. F. Fitz Simmons
 Gas jet igniting and cutting-off device.....
2 pats.....F. Rossbach-Rousset
 Gas machine.....J. T. Wood
 Gas producers, furnaces, &c. Feeding device
 for.....S. Forter
 Gas reheating furnace, Regenerative.....F. Siemens
 Gas valve, Combination duplex.....G. Wilson
 Gases non-explosive, Rendering storage bat-
 tery.....T. A. Edison
 Gasket.....O. Reinvaldt
 Gear, Variable speed and reversing.....J. C. Busche
 Gear wheel.....M. McIntyre
 Gearing, Worm.....J. W. Moakler
 Gin saw cleaner, Cotton.....J. Y. Clark
 Glass bottle, &c., making machine.....J. Forster
 Glass bottle manufacturing machine.....C. Leistner
 Glass furnace.....J. E. Berry
 Glass pressing and blowing machine.....W. B. Fenn
 Glass, Silvering or resilvering.....H. P. Strahan
 Glass working machine.....J. W. Colburn
 Glassware, Machinery for the manufacture of
R. Good, Jr
 Glassware manufacturing machinery.....K. Good, Jr
 Gold leaf condenser.....J. D. Foad
 Grain bin signal.....J. G. Raygor et al
 Grain binder automatic trip.....E. A. Johnston
 Grain, &c. Contrivance for regulating the
 distribution or feed of.....R. H. McClelland
 Grain scourer.....J. E. Mitchell
 Grinding machine.....V. P. Buck
 Guard board.....J. L. Gallicez
 Gun, Breech loading breakdown.....H. H. Fox
 Gun, Spring air.....M. F. Stanley
 Hame and trace connector F. A. Klappauf et al
 Harrow.....G. W. Hoyle
 Harvester binder protector attachment.....J. N. Buser
 Harvester, Broom corn.....F. Sutton
 Harvester grain carrier.....H. W. Lampe et al
 Harvester headboard, Grain.....C. Doering
 Harvesting machine.....A. Castelin
 Hat dipping machine.....S. H. Fanton
 Hay carrier.....W. A. Law
 Heating apparatus, Combined W. H. Denslow
 Heating device, Automatic low pressure.....
E. H. Gold
 Hide or skin putting out machine R. W. Strout
 Hinge.....A. A. Page
 Hoist brake device, Frictional.....D. R. Ferguson et al
 Hoisting and transferring loads, Means for.....
C. A. Morris
 Hoisting and transferring loads, Mechanism
 for.....C. A. Morris
 Hoisting and transferring mechanism.....C. A. Morris
 Hoof pad, Auticontraction steel bar.....J. W. H. Chrisman
 Horse blanket.....L. F. Mattingly
 Horseshoe.....M. D. Glasebrook
 Horseshoe calk.....H. Paar
 Horseshoe elastic thread attachment.....J. N. Hornblower
 Hose coupling.....A. J. Smith
 Hose coupling.....W. S. Jewell
 Hose coupling.....F. A. Silvis et al
 Hot air furnace.....F. Warner
 Ice creeper.....C. F. Jolitz
 Implement, Pocket.....W. H. Nicholls
 Incandescent mantle support.....M. Herskovitz
 Inkstand.....W. H. Wetmore
 Insulated conductor and process.....J. C. Lee
 Insulator.....F. M. Locke
 Jar or bottle closure.....P. H. A. Leder
 Jewelry component.....J. C. & J. A. Doran
 Jointer guard.....J. A. Davidson
 Journal box.....S. M. Lewis
 Journal box, Self-oiling.....H. T. Spears
 Lace Shoe.....C. B. Isakson
 Lacing.....D. G. Sunderland
 Ladder and platform, Combined M. Cirigliano
 Lamp attachment, Electric.....H. D'Oliver, Jr
 Lamp cluster and switch.....R. B. Benjamin
 Lamp, Vapor burning.....R. W. Zierlein
 Latch.....H. F. Kiel
 Latch.....J. C. Hardenbergh
 Lathe adjustable tool holder, Turret.....C. E. Search et al
 Lathe, Engine.....R. Tegler
 Laundry marker.....C. A. Bunker
 Lead, Manufacturing spongy J. H. Mercadier
 Lift or the like.....H. D. Barlow
 Lifting jack.....G. Wideman
 Lifting jack.....L. E. Hocker
 Liquid fuel distributor.....J. E. Raff
 Liquid or viscous substances, Machine for
 applying.....M. M. Nicholls
 Liquid separator, Centrifugal B. A. O. Prollius
 Liquid separator liner, Centrifugal.....C. H. Hackett
 Loading apparatus, Wagon.....F. L. Doty
 Loading device, Automatic.....T. M. Park
 Locking device, Drawer.....A. G. Johnson
 Locket.....W. H. Rice
 Locomotive brake, Overhead electrically
 driven.....A. E. Brown
 Locomotive, Electrical.....A. E. Brown
 Locomotive sand box filling apparatus.....C. A. Barrett
 Loom filling feeder, Weft replenishing.....W. Oldfield
 Loom jacquard apparatus.....W. W. Hodgson
 Loom let off.....A. R. Gossett et al
 Loom shuttle.....J. C. Brooks
 Loom weft replenishing means.....J. A. Gendron
 Loom weft replenishing mechanism.....F. O'Donnell
 Luggage carrier.....2 pats.....C. Lederman
 Mail bag holder.....N. Olson
 Massaging implement.....A. U. Patchen
 Match receptacle, Burned and unburned.....H. S. Alexander
 Measuring instrument damping device.....V. Arcioni
 Measuring instrument, Optical J. G. Stewart
 Measuring vessel.....O. G. Kelly
 Mechanical movement.....J. T. Hogan
 Mechanical movement.....J. W. Martin
 Metal, Expanded.....N. E. Clark
 Metal strips, Machine for producing crimped
 or corrugated.....W. P. Grafton
 Mold.....J. M. Oze
 Mortising machine.....H. S. Spencer
 Motor control.....2 pats.....J. D. Ihlder
 Motor control, Alternating current M. Milch
 Movements from a distance, Means for con-
 trolling.....M. R. Hanna
 Muffler.....N. T. Harrington
 Music roll for pianolas, &c.....W. S. Pain
 Music roll inclosing case, Automatic.....M. S. Wright
 Music sheet spool, Perforated.....F. Taft
 Musical instrument pneumatic action.....M. S. Wright
 Musical instrument, Stringed.....A. Olson
 Musical instruments, Expression mechanism
 for pneumatically actuated.....E. S. Votey
 Nail.....2 pats.....E. P. Hurd
 Necktie fastener.....W. C. Doyle
 Nut lock.....J. E. Hart
 Nut lock.....F. Reed
 Nut lock.....W. Jarrell
 Oil burner and furnace, Combined fuel.....
A. J. Smithson
 Oil, Drying.....W. N. Blakeman, Jr
 Oil separators, Apparatus for controlling the
 discharge of drops from.....M. P. Osbourn
 Ore concentrator.....C. A. Christensen
 Package carrier.....T. Harris et al
 Packages, Mechanism for filling and settling
 goods in.....W. H. Doble
 Packing, Piston.....M. M. Barnes
 Paint compound mixture.....W. N. Blakeman, Jr
 Paper clip.....A. Weiss
 Paper cutting machine.....L. Alliss
 Paper drier.....W. White
 Paper fastener.....C. D. Bronson et al
 Paper fastening device.....T. F. Russell
 Paper knife and mail opener, Combination.....
J. A. Knight
 Pasteurizer.....3 pats.....W. J. Ruff
 Peeler, Vegetable.....J. N. Buell
 Peeling machine, Tomato.....G. G. Glenn
 Photographic developer.....B. Homolka et al
 Piano action.....C. Berglund et al
 Piano pin and string treating composition.....
C. H. Pierce
 Pick.....S. Montgomery
 Pictures, shades, &c. Pole for hanging or
 taking down.....P. E. Page
 Pin tongue joint.....C. W. Kelley
 Pipe or cigar holder mouthpiece.....C. Elkin, Jr
 Pipe puller.....J. W. Walker
 Pipe trap, Waste.....T. Linke
 Pipe wrench.....C. H. Thurston
 Planing machine cutter, Wood G. Johnson, Jr
 Planing or like machines, Driving mechani-
 sm for.....R. W. & L. H. Bateman
 Plaster, &c. Composition for wall.....A. W. Perkins
 Pliers, Impressing and perforating.....J. Sohn
 Plow, Beet.....H. F. Thompson
 Plow turf cutting attachment.....F. Renfrow
 Plumb and level.....C. J. Dewaine
 Pocket book.....H. Brueger
 Post or pole.....D. Warner
 Powder pellets, Machine for manufacturing
 compressed explosive.....L. Davies
 Power factor indicator.....L. T. Robinson
 Power transmission.....W. Stanley
 Preservation of food, Apparatus for the.....
C. Beale
 Printing machinery, Pattern.....C. L. Burdick
 Projectile.....G. W. Ball
 Pump, Duplex.....D. F. Lepley
 Pump engaging or disengaging device, Auto-
 matic air.....C. Nielsen
 Pump, Oil well.....W. Taylor
 Pump, Rotary.....W. W. Robinson
 Pumping engine, Duplex.....E. Vogel
 Punching machine.....T. F. Philippi
 Puzzle.....W. J. Kelly
 Rail clamp.....J. Talbert
 Rail, Guard.....D. F. Vaughan
 Rail joint.....J. T. Davis
 Railway cable clip, Suspended cable.....H. W. Reinhold
 Railway cattle guard.....G. W. Gwyn et al
 Railway conductor, Electric.....A. Whittier
 Railway cross tie and clamp.....E. Flora
 Railway or tramway rail.....J. Bigwood
 Railway switch.....C. Gushwa et al
 Railway switching apparatus.....J. P. Coleman
 Railway tie, Metallic.....D. P. Bosworth
 Rake.....M. F. McLoughlin
 Ram, Hydraulic.....E. H. Foster
 Reinforce.....J. F. Francia
 Releasing die, Turret or screw machine.....C. M. Smillie
 Rheostat.....I. B. Smith
 Rice polishing machine.....R. W. Welch
 Roller screen.....M. F. Hutchison
 Roof repairing apparatus, Shingled.....L. S. Boulter
 Rolling black plates or sheets.....C. W. Bray

Rolling mill feed mechanism . . . C. W. Bray
Roofing or siding . . . F. W. Terpening
Rotary mold . . . J. C. Davis
Sad iron support . . . A. Stamm
Sash lock . . . A. J. Ashley
Saw holder . . . T. D. Gayle
Sawing apparatus. Crosscut . . . D. E. Crouch
Sawing machine . . . O. W. Fairfield
Sawing machine. Box stuff . . . G. A. Smith
Scaffolding bracket . . . J. M. Sackman
Scale frame . . . C. B. Hurst
Scale. Wagon . . . C. Skidmore
Screen . . . W. E. Monroe
Seaming head. Double . . . A. D. Lugibihl
Separating device . . . D. K. Swartwout
Sewing machine. Buttonhole. D. H. Haywood
Sewing machine. Buttonhole. J. T. Hogan
Sewing machine feed mechanism. J. C. Fogarty
Sewing machine. Ornamental stitch . . . D. Griffiths
Sewing machine. Shoe . . . E. Smith
Shade mounting. Window . . . H. Dittenheimer et al
Shade roll bracket . . . P. Lanouette
Sharpening device. Disk plow . . . I. Owens
Shaving machine . . . R. W. Strout
Sheave, wheel, or pulley . . . R. H. Bowen
Sheet metal box . . . J. A. Bower
Shingle die . . . N. E. Palmer
Shipping box packing frame . . . C. A. Haas et al
Shoe shining machine . . . S. Browne
Shot making machinery. W. H. Pearson et al
Shovel protector plate . . . W. W. Davis
Show case . . . L. J. Everest
Show case. Knockdown all glass . . . W. K. Williams
Show windows. Means for illuminating . . . G. K. Maltby
Sign, &, post. Street . . . B. Haskell
Sign. Street . . . M. Hofheimer
Signs. Card or ticket for actuating the mechanism controlling electric light . . . M. Norden et al
Skein package . . . R. A. Bonner
Skirt supporter and placket fastener. Combined . . . E. Clewell
Sled. Coasting . . . W. E. Kidder
Slicer. Potato . . . C. Canclini
Smoker's accessory . . . J. Weissenstein
Snow scraper . . . I. Wonnacott
Soldering apparatus . . . J. A. Wirth et al
Soldering armature leads to commutator bar . . . J. Beech
Sole cutting rounding machine tool . . . D. F. Hartford
Spark arrester. Locomotive or other boiler . . . J. C. Bowring
Speed indicating alarm . . . F. S. Cahill et al
Spike extractor . . . L. D. Butters
Spirometer . . . H. T. Lytleton
Spring support . . . G. E. Bigelow
Stacker. Hay . . . F. L. Doty
Stave sawing machine . . . T. H. Webster
Stay covering machine. Dress . . . W. F. Osborne et al
Steam boiler. 2 pats. . . F. Burger et al
Steam boiler. Fire tube . . . G. Inglis
Steam generator . . . W. Mitchell
Stocking . . . H. Brown
Stove . . . F. J. Ploch
Stove, furnace, &c., cleaning device . . . V. K. Korjibsky
Stove. Gas . . . J. J. Konigs
Stove or furnace. Heating . . . E. O. Daniels
Stovepipe clamp . . . G. E. Reynolds
Strainer . . . F. H. Vogt
Strainer. Teapot . . . A. F. Barrett
Stropping machine . . . O. Kampff
Superheater . . . J. H. Rosenthal
Switch throwing device . . . W. B. Berry
Syringe. Hypodermic . . . H. J. Detmers
Syrup cups, &c. Double lid for . . . J. L. Taylor
Tapping apparatus . . . F. Pentlarge et al
Target trap discharging mechanism . . . P. North
Telegraph receiving device. Wireless . . . J. S. Stone
Telegraph signals. Apparatus for simultaneously transmitting and receiving space . . . J. S. Stone
Telegraph signals. Receiving space . . . J. S. Stone
Telegraphy. Space . . . 31 pats. J. S. Stone
Telephone circuit . . . W. W. Jacques
Telephone hook switch . . . C. T. Mason
Telephone support and switch . . . F. R. McBerty
Telephone switchboard circuit party line ringing device . . . J. W. Lattig et al
Telephone system . . . F. R. Parker
Telephone transmitter . . . C. W. Harper
Thermometer. Incubator . . . A. Neubeck
Thread dressing machine . . . G. A. Fredenburgh
Thread dressing machine thread immersing device . . . G. A. Fredenburgh
Three way split switch . . . T. Dean
Threshing machine . . . H. Schleusner
Ticket distributor . . . C. H. Townsend
Till. Shop check . . . W. W. Connell
Time recorder. Watchman's . . . J. & H. E. Summers
Tire . . . J. B. London
Tire inflating device. Pneumatic . . . F. Glassup
Tire tightener . . . N. T. Leveritt
Tire. Vehicle . . . C. Stein
Tires. Shaping rubber wheel . . . F. S. OrNSTEIN
Tobacco pipe . . . W. Disch
Tool. Electrically heated . . . T. Van Aller
Toolstop. Machine . . . J. B. Orbinson
Torpedo . . . G. G. Turner
Torpedo. Dirigible. 3 pats. D. W. McCaughey
Toy pistol . . . R. A. Brooks
Track lubricator. Automatic . . . R. G. York
Tram or railway point or switch and means for working same . . . J. Leighton et al
Transformer earth shield . . . C. F. Scott
Transformer. Multiple secondary . . . J. S. Peck et al
Trolley pole head . . . J. E. Greenwood
Trolley wheel . . . E. W. Potts
Trolley wheel. Self lubricating . . . E. W. Potts
Trolleys. Means for operating overhead . . . A. E. Brown
Truck . . . W. G. Price et al
Truck. Lumber . . . W. J. Daley
Truck. Swivel . . . W. L. McCabe
Trunnion for shutters, &c. . . J. H. French
Truss . . . J. M. Simmons
Tubes. Apparatus for safe ending . . . P. H. Seery
Turbine. Elastic fluid . . . H. Wiesner

Turbine. Steam . . . P. J. Hedlund
Turbine with locomotives and vehicles. Combination of the reversible steam . . . G. S. Granlund
Turn table. Switching . . . A. E. Brown
Type writing machine . . . J. Oppenheim
Type writing machine . . . L. H. Perry
Type writing machine . . . J. C. St John
Type writing machine ring shifting device . . . G. M. Kitzmiller
Type writing machine. Shorthand . . . P. A. Vogel
Type writing machine tabulating device . . . J. B. Secor
Type writing machine type bar supporting ring and hanger . . . G. M. Kitzmiller
Unloading apparatus . . . R. H. Dempcy
Upholstery spring support . . . G. E. Bigelow
Valise. Rail . . . J. Ruegg
Valve centralizing operating mechanism . . . R. C. Bromley
Valve gear . . . G. W. Spragins
Valve gear. Internal combustion engine inlet . . . A. P. Brush
Valve. Hydraulic . . . M. Sjöberg
Valve mechanism. Basin outlet . . . G. A. Soderlund
Valve. Steam actuated . . . L. Picard et al
Vapor or gas exhausting apparatus . . . V. Schwaninger
Vaporizer . . . W. E. Ver Planck et al
Vehicle . . . W. W. Robinson
Vehicle. Autotractor . . . A. Wenberg
Vehicle wheel . . . A. J. Carley
Vehicle wheel runner attachment . . . G. F. Meyer
Vending machine . . . R. Ziebell
Veneer cutting machine . . . J. Wolfinger
Veneer drier . . . A. S. Nichols
Veneer sawing machinery . . . A. B. Calkins
Vertical tubular boiler . . . W. Norris
Vessel fin. Adjustable . . . H. J. Noll
Vessel. Submarine salvage . . . J. M. Raoul
Wagon seat lock . . . L. P. Moore
Wall construction . . . J. A. Ferguson
Wall construction. 2 pats. . . F. E. Kidder
Washing machine . . . T. J. Steen
Water heater . . . J. H. George
Water purifier 2 pats. . . W. H. Green
Water purifying apparatus . . . C. L. Kennicott
Weather strip. Door . . . T. D. Snow
Weighing and filling machine . . . W. H. Doble
Well . . . M. D. Rochford
Well drill. Deep . . . A. F. Farling
Wheel rim finishing machine . . . N. D. Chard
Whiffletrees to cross bars. Device for attaching . . . B. H. Kellogg
Windmill regulator. Automatic . . . A. P. Hoelsy
Window cleaning device . . . C. Levy
Window opener . . . J. C. Zutt
Window. Prismatic . . . G. K. Cummings
Window screen . . . H. W. Peighlul
Window screen and sash. Adjustable . . . H. H. Kerckhoff
Wire fastener . . . J. E. Waters
Wire stretcher . . . G. H. Mielke
Wire stretcher . . . J. H. Ladd
Woodwork polishing wheel . . . C. H. Kimberly
Work holder . . . O. H. Eichblatt
Wrench . . . C. Glover et al
Wrench . . . D. F. Taylor
Wrench . . . W. A. Lefler

DESIGNS.

Brushes, mirrors, or similar toilet articles. Back for . . . W. H. Blake
Card mount . . . H. H. Collins, Jr
Clock stand. Electric alarm . . . A. Y. Darche
Comb . . . F. W. Grell
Grave marker . . . F. L. Miller et al
Spoons, forks, or similar articles. Handle for . . . E. Goetze
Stove window setting . . . C. F. Drury

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MECHANICAL PATENTS.

Acid anilid orthocarboxylic acid and making indigo. Glycollic . . . B. Homolka et al
Acid plant. Sulfuric . . . A. Zanner
Acids. Forming organic peroxid . . . A. M. Clover
Adding machine . . . H. C. Dungan
Adding machine correcting mechanism . . . C. Wales
Air brake . . . 2 pats. J. M. McElroy
Air brake pipe coupling . . . T. F. Lord
Air brake. Railway . . . P. Jacobson
Air motor . . . A. F. Larson
Amusement apparatus . . . H. N. Ridgway
Animal trap . . . G. J. Miller
Animal trap . . . J. O. Smith
Antiseptic compound. 2 pats. . . A. M. Clover
Auger. Earth . . . N. Erzig
Automobile. Steam . . . R. H. White
Automobile steering apparatus . . . H. E. Hoenig et al
Ax handle straightening apparatus . . . S. D. Sullivan
Back and head rest . . . S. A. Weiss
Badge or button . . . N. Fisher
Balls, &c. Compound sheet material for manufacturing golf . . . E. Kempshall
Bank register and remittance sheet . . . M. P. Exline et al
Barber's turn . . . J. M. Shanahan
Barrel . . . F. Bosken
Barrel . . . C. Paonessa
Basin. Catch . . . T. D. Pierce
Beam. Combined steel and concrete . . . J. Kahn
Bearing. Antifriction . . . V. L. Rice
Bearing. Roller . . . R. L. Ellery
Bed bottom . . . W. B. White
Bed. Folding . . . S. Holmgren
Bed or seat. Spring . . . H. & F. Rumpf
Bedsprad . . . M. H. Fine
Beehive doorway and door . . . G. W. Jackson
Beer. Pasteurizing . . . E. Wagner
Belt guide . . . E. W. Brutlag
Binder. Loose leaf . . . I. Wide
Blank . . . G. W. Heene
Blind rod clamp . . . J. F. Miller
Block molding machine . . . J. W. Sanderson
Block signal and track switch operating device . . . C. R. Van Trump
Boat. Life . . . R. D. Mayo
Boiler cleaner. Steam . . . A. J. Schveers
Boiler flue cutter . . . J. W. Faessler

Boiler safety device 2 pats . . . P. J. Lockwood
Boilers. Apparatus for circulation in . . . H. Altmayer
Bolt cutter . . . R. W. Slaughter
Bookbinding machine . . . C. H. Crowell et al
Bottle . . . D. M. Hall
Bottle. Non-refillable . . . T. F. Odell
Bottle soaking machine . . . J. Schreiber, Jr
Bottle stopper . . . T. S. Patrick
Bottle stopper and fastener . . . P. McMenamin
Bottle washing machine . . . E. A. Lufkin
Bottle washing machine . . . C. E. Tunelius
Bottles, jars, &c. Stoppering . . . F. Lecourt
Box lid support . . . A. E. Cox
Braiding machine . . . J. Lundgren
Brake and automatic stop device . . . J. C. Smith
Brake pressure mechanism. Automatic differential . . . J. Lord
Brick facing machine . . . H. H. Smith et al
Brick kiln . . . C. F. Kaul
Brush . . . S. J. Ballard
Brush breaker . . . O. Hatfield
Brush rack. Tooth . . . G. Howard
Building construction . . . J. T. Ryther
Bundletie . . . S. Walker
Burial casket . . . E. A. Post
Button. Safety collar . . . L. Blake
Candle . . . W. Ehrhardt
Cap. Combined tourist and automobile . . . R. Fox
Car brake . . . A. Pfoser et al
Car coupling . . . J. A. Hinson
Car door. Freight . . . A. L. Champion
Car door. Grain . . . W. L. Shless
Car. Dump . . . O. W. Meissner
Car. Dumping . . . A. F. Bernard
Car fender . . . G. H. Fraser et al
Car fender . . . L. M. Maxham
Car fender . . . S. S. Hawley
Car, &c., fender . . . W. L. Green
Car haul safety device . . . W. J. Patterson et al
Car or lorry. Stock collecting . . . S. W. Vaughn et al
Car starter . . . J. S. Linderman
Carbureting lamp . . . J. Maton
Car cases of hogs or other animals. Apparatus for dividing . . . H. Pratt
Card case . . . W. S. Bracktle
Card holding and exhibiting device . . . J. D. Karle
Carriage top. Folding . . . H. H. Robinson
Carrier system switch . . . M. C. Richards
Carton. Inner seal . . . L. E. Lee
Casing clamping wrench . . . J. G. Winger
Cement post . . . C. L. & J. H. Catherman
Chain wrench . . . J. M. Reams
Chair back. Adjustable . . . C. O. Roberts
Chuck . . . A. A. North
Cigarette wrapper tubes. Machine for inserting cotton in . . . S. D. S. Rakowitzky
Clamp . . . M. E. Hunter
Clamp hook . . . C. Knibbs et al
Clock contact device. Electric . . . R. Carlstedt et al
Clock. Electric striking . . . R. Carlstedt et al
Clock. Speed . . . K. H. McIntyre
Clothes hanger . . . F. T. Johnson
Clothes rack . . . J. H. Harrell
Clothes sprinkler . . . B. Livengood
Coffee or spice mill . . . J. W. Kirby
Coke extractor . . . W. H. McConnell
Collar . . . A. L. Willard
Combining machine. Wood . . . T. K. Lee
Compasses . . . G. Le Blanc
Computing machine. Interest . . . I. N. Sweet
Concrete floor construction . . . F. J. Lyons
Controller . . . H. L. Bachman
Controller lever step motion . . . I. B. Smith
Conveyer . . . S. B. Peck
Copy holder . . . J. L. Rivers
Copying machine. Letter . . . W. E. Peck
Cork stopper . . . M. Montaner
Corn husker and chopper . . . J. Willmann, Sr
Corn husking and fodder preparing machine . . . F. Vejrosta
Corn husking device . . . J. Barnard
Corner protector . . . T. Scherf
Cotton picker . . . J. K. Piper
Cotton picker's grid bar . . . A. A. Sweet
Crushing or pulverizing mill . . . E. C. Griffin
Crystallizing apparatus . . . E. von Seemen et al
Cuff holder . . . H. H. Wailey
Cultivator hiller attachment . . . H. M. Burdick
Cultivator. Straddle row . . . T. H. Cameron
Cultivator trip. Spring . . . I. A. Weaver
Current motor. Alternating . . . M. Milch
Current series motor. Constant . . . M. Leblanc
Current voltage. Means for varying alternating . . . J. E. Woodbridge
Cushion frame . . . A. P. Morrow
Cyclogeraniolidenacetone and making same . . . G. Merling et al
Desk attachment . . . W. B. Bridges
Digging or dredging bucket . . . W. S. Ferguson
Disinfecting devices. Door closer and check for operating . . . F. A. Martin
Door check and lock . . . A. Kalb et al
Door guide. Sliding . . . E. T. Robinson
Door hanger . . . J. T. McCabe
Draft equalizer . . . W. S. Livengood
Draft equalizing mechanism . . . P. Hanson
Draw gear and buffing apparatus . . . P. Hien
Drawer, box, or receptacle. Hardware, &c. . . H. O. Amundson
Dredges. Rotary cutter for hydraulic . . . E. T. Williams
Drier track construction . . . W. P. Hussey
Drill sleeve . . . R. A. Lachmann
Dyeing and washing machine . . . C. Corron
Dynamo or motor suspension . . . M. Moskowit
Eggs, cream, vegetables &c. Beater, mixer, and masher for . . . W. Sturm
Electric battery . . . P. J. Kamperdyk
Electric circuit breaker . . . W. J. Lloyd et al
Electric conduit box . . . D. Shea
Electric controller . . . M. S. Horton
Electric cut out . . . J. C. Tournier
Electric furnace . . . C. G. P. de Laval
Electric meter controlling means . . . W. H. Pratt
Electric snap switch . . . N. Marshall
Electric switch and circuit breaker . . . C. E. Carpenter
Electric switch and circuit breaker . . . A. J. Horton
Electrical indicator . . . L. H. & G. H. Sanford
Electrical selecting or individualizing instrument . . . W. S. Burnett
Electricity meter . . . A. Blanchet
Electrochemical apparatus connector . . . O. P. Fritchle

Electromagnet switch . . . S. B. Stewart, Jr
Electromagnet switch and signal . . . S. B. Stewart, Jr
Embroidering machine trimming mechanism . . . W. Bowden
End gate . . . A. J. Allen
Engine . . . W. S. McKinney
Engine cylinder. Steam . . . A. L. Williams
Engine starter. Gas . . . G. S. Billman
Engine vaporizer. Internal combustion . . . C. J. Everett
Envelop . . . W. W. Ormsbee, Jr
Envelop feeding machine . . . E. Meier
Essence extracting apparatus . . . E. E. Hand
Excavating machine . . . J. P. Gordon
Expansion bolt . . . J. Jenkins
Explosive compound . . . N. Ceipek
Fabric splitting machine. Duplex woven . . . B. S. Smith
Fabrics with fluid substances. Machine for impregnating . . . H. A. Mann
Fan. Rotary . . . S. S. Williamson
Fanning mill . . . N. M. Bowen
Farm implement . . . A. R. Jeffrey
Feeder. Automatic boiler . . . N. F. Roadhouse
Fence lightning stay . . . J. N. Reynolds et al
Fence post . . . L. Kypke
Fencing. Machine for weaving diamond mesh . . . G. W. Whittington
Filter . . . O. Selg et al
Filtering apparatus . . . R. B. Turner
Finger ring . . . G. W. Hutchison
Fire kindler . . . G. H. Lotspike
Firearm sight . . . K. Tideman
Fireproof floor or ceiling . . . J. Kahn
Fish and game trap. Combined . . . T. A. Cassels
Fish hook . . . J. Hedlund
Fluid tank indicator . . . F. E. Ballard et al
Flushing apparatus . . . J. Denton
Fluting device . . . H. S. Pease
Folding box or crate . . . P. J. Healy
Folding machine slit . . . H. K. King
Fruit drier . . . S. L. Feathers
Fuel economizer . . . E. Green
Fuel feeding apparatus. Fine . . . M. Prigga
Furnace skip car or hoist. Blast . . . S. W. Vaughn et al
Furnace top and charging device. Blast . . . S. W. Vaughn et al
Fuse link . . . E. L. Simons
Galvanic battery . . . A. J. Jacobson
Game apparatus . . . C. K. Probes
Game apparatus . . . G. W. Norton et al
Garment hanger . . . J. S. Gager
Garment holder . . . T. J. Fearn
Garment supporter and fastener . . . J. H. & I. Taylor
Gas cleaning apparatus. Electrical . . . C. G. Hardie
Gas. Manufacture of carbonic acid . . . W. J. Knox
Gas valve. Safety . . . P. L. Salemi
Gas washing mechanism . . . A. M. Hunt et al
Gases. Utilizing waste . . . A. Schutt
Gasifier . . . R. T. Harris
Gate . . . W. H. Griffith
Gearing and controlling means therefor. Variable speed transmission . . . T. B. Rennell
Gearing . . . A. Plagman
Glass vessel. Sectional . . . W. B. Feun
Glass working machine . . . I. W. Colburn
Glue or size. Manufacturing . . . P. Fargas-Oliva
Governor. Centrifugal . . . C. A. Faessler
Governor. Gasolene engine . . . D. C. Stover
Gravity incline machine . . . H. C. O'Brien
Grinding machine. Twist drill . . . C. A. Chandler
Guard. Safety . . . W. K. Page
Gun. Spring . . . R. Braun
Harrow . . . T. G. Davis
Harvester and thresher . . . L. B. Mack
Hay rake. Adjustable . . . W. F. Reed
Hay raker and loader . . . W. J. Cook
Hay tedder . . . H. M. Cooley
Hay unloading device . . . F. Crawford et al
Headwear . . . B. Brown
Hitching device . . . J. B. Sweetland
Hoop tightener. Tank . . . H. Notthoff
Horse checking device . . . F. Rudolph
Horseshoe . . . R. B. Price
Hose blower . . . J. J. McIntyre et al
Hose repairing lining . . . J. McKinley
Hot water heater . . . C. C. Longard
Hydrocarbon burner . . . T. Simon
Hydrocarbon burner . . . P. Ullmann
Hydrocarbon burner. 2 pats. . . A. M. Hunt et al
Hydrocarbon burner . . . N. Edwards
Incandescent filaments and mantles. Manufacture of . . . A. M. Plaissetty
Indicating instrument . . . W. B. Potter
Ink font . . . I. L. Davenport
Inkstand . . . J. F. Fitzsimmons
Inkstand . . . G. J. Sengbusch
Internal combustion engine . . . L. Bayer
Interrupter . . . E. W. Kelly
Iron and steel and their alloys. Manufacture of . . . 3 pats. J. Baxeres de Alzugaray
Jar, &c., cover fastening . . . J. S. Du Bois
Kneading board . . . M. Ams
Knife rack . . . L. D. Patten
Knitting machine embroidering attachment . . . S. Cary
Knitting machine thread-changing mechanism . . . E. R. Thierfelder
Circular . . . E. A. Hirner
Knuckle pin support . . . G. Taggart
Lamp . . . W. E. Porter
Lamp bracket . . . E. O. Hamilton
Lamp filament attachment. Electric glow . . . F. Fanta
Lamp for photographic dark rooms . . . H. F. Schwartz
Lamp. Incandescent electric . . . D. J. O'Brien
Lamp. Miner's safety . . . A. Wiedenfeld
Lamp. Oil . . . L. Johnson
Lamp. Vapor incandescent . . . L. Ljais
Latch . . . C. B. King
Lathe attachment. Spinning . . . L. C. Kahl
Lathe. Woodworking . . . J. M. Kuebler
Ledger or binder. Loose leaf . . . E. C. Suckert
Lifting jack . . . W. A. Johnston
Lightning arrester . . . C. A. Rolfe
Linoleum. Machinery for manufacturing patterned . . . P. Blaibach
Liquid dispensing apparatus. Coin controlled . . . A. F. Bradshaw
Log loader . . . O. L. Raymond
Log wagon bunk block . . . J. B. Capshaw
Loom for weaving pile fabrics . . . 2 pats. W. G. Hartley
Loom for weaving velvet . . . W. G. Hartley
Loom shedding mechanism . . . C. F. Perham

Loom harness operating mechanism.....C. F. Perham
Loom shuttle. Self threading.....C. W. Frost
Lubricator.....C. B. King
Machine dog.....M. B. Hill
Mail box.....F. L. Walsh
Massage implement.....G. Dittmar
Match scratcher.....C. R. Wilson
Mechanical movement.....B. Hall
Metal from ores. Extraction of.....C. H. Webb
Metal plates. Producing composite.....F. E. Canda
Milk can fastening and sealing device.....R. S. Schrum
Miter box.....R. F. Folk et al
Miter box.....S. D. Hoy
Mold.....F. F. Cole
Molding bit.....H. R. Miles
Molding machine.....G. W. Packer
Molding machine. Rotary.....J. W. Sanderson
Mortising machine. Hinge.....J. A. Mackenzie
Motion. Device for converting E. C. Northrup
Motor starting device. Explosion.....C. R. B. Keetley
Motors. Limiting the speed of constant current series.....M. Leblanc
Mowing machine.....P. Hanson
Multiple cylinder engine.....E. A. Jones
Musical instrument. Automatic.....P. Welin
Nail clipper.....I. D. Sickles
Necktie.....M. F. Powers
Newspaper holder and binder.....G. Becherer
Nozzle. Adjustable.....T. E. Twist
Nurling machine.....L. A. Casgrain
Nut cracker.....H. W. Mather
Nut tapping machine.....G. F. Zwilling et al
Nut wrench.....J. W. Wickelried
Oil burner.....F. W. Hitchings et al
Oil can.....A. O. Bolen
Oil interceptor.....T. R. Wingrove
Oiling device.....E. C. Ferris et al
Oven. Drying.....M. M. Suppes et al
Package. Paper fastener.....G. H. Cliff
Packaging candies, &c. Machine for.....E. F. W. Wieda
Packaging machine. Candy.....E. F. W. Wieda
Packing or cushion for shipping purposes.....I. H. Walker
Packing ring. Jointed piston head J. Murphy
Painter's appliance.....T. R. Hines
Painting or liquid coating machine. Automatic.....O. S. Mills
Paper and making same. Embossed wall.....A. Leisel
Paper cutting and folding machine.....S. D. Ruth
Paper. Making.....R. S. Case
Paper making machine.....E. Waite
Peat blocks. Manufacture of F. W. Gaertner
Pen and pencil tray.....D. C. Beckett
Pen. Drawing.....G. Schoenner
Pen. Fountain.....A. Eberstein
Pen. Recording.....C. J. Manning
Pen. Ruling.....E. A. Bagby
Photographic film holder.....M. L. Schoebel
Piano tuning hammer.....F. E. H. Goodenow
Pile fabrics. Mechanism for cutting loops of.....W. G. Hartley
Piling mechanism.....S. V. Huber
Pinion housing.....J. R. George
Pipe coupling.....O. Eisenhuth
Planter. Check row corn.....G. A. Seculer et al
Plastic material. Machine for making products of.....W. E. Jaques
Plow guide and draft attachment L. W. Kausch
Pneumatic carrier.....C. H. Burton
Pneumatic despatch apparatus.....C. H. Burton
Potato dropper.....J. L. Smith
Power transmitting device.....I. Deutsch
Power transmitting device.....G. R. Dean
Printing press attachment.....L. Andrien
Printing press paper feeding mechanism.....J. E. Tucker
Printing press tympan guide and holder.....J. W. Allers
Propelling device.....C. A. Manker
Protractor.....E. E. Court
Pulp article. Hollow.....J. H. Rivers
Pulp articles. Apparatus for forming hollow.....J. H. Rivers
Pulp articles. Machine for forming hollow.....J. H. Rivers
Pulp. Forming stoppers, &c. from fibrous.....J. H. Rivers
Pulp stock. Apparatus for treating.....J. H. Rivers
Pulverizer. Soil.....J. Dorsett
Pump controlling means.....W. Small
Pump for air, water, or other fluids. Rotary.....J. Aiken
Pump top heads. Bushing for air W. H. Walker
Pumping apparatus.....A. C. E. Rateau
Punch. Hand.....G. A. Huber
Pyrazolone compound and making same.....M. Overlach
Pyrotechnic signal alarm and burning torch.....J. C. Moore
Rail bond.....E. G. Thomas
Rail joint.....J. J. Sulkey
Railway crossing frog. Continuous.....W. H. H. Elliot
Railway rail connection.....G. J. Maringer
Railway rail fastener.....G. W. Smith
Railway rail fish plate joint.....reissue
Railway tie.....W. F. Bossert
Railway rail. Metal.....J. Coughlan
Railway spike.....I. Copeland
Railway switch.....F. L. Maurer
Railway switch.....T. A. Bowen
Railway switches. Apparatus for moving or shifting.....L. H. Thullen
Railway tie.....G. H. Kimball et al
Railway tie.....R. R. Spore
Railway tie.....W. Frazer
Railway tie and rail fastening device. Combined.....J. T. Griffin
Railway track rail supporting stringer.....H. R. Keithley
Railway track tie plate.....J. Sneider
Railway train telephone and signal apparatus.....B. W. Speck
Range Gas.....W. A. Mills et al
Ratchet wrench.....C. B. Gracey
Receipt form or blank.....E. K. Nadel
Recording or checking device for the movements for watchmen or others.....A. Bopp
Refrigerating systems. Foreign gas extractor for.....F. W. Lanphier
Register.....L. Linville
Rheostats. Contact clamp for carbon.....C. W. Larson

Rheostat.....I. B. Smith
Rolling mill leading spindle and coupling.....M. M. Suppes
Rolling mill shaft coupling.....M. M. Suppes
Roof. Saddle.....C. Loehle
Rosette.....A. P. Seymour
Saddle. Pneumatic harness.....J. F. Plander
Safe.....reissue.....J. B. Boos
Salt cellar.....W. B. Fenn
Sash fastener.....H. C. Heitinger
Scraper and dumping device. Combined dumping.....W. S. Deidrich
Scraper. Road.....S. R. Johnson
Screw driver.....T. W. Fisher
Scuttle cover lock.....O. Adams
Seal. Snap.....E. J. Brooks
Sewer, &c. mold.....J. B. Blaw
Sewing machine. Blindstitch.....C. E. Hadley
Sewing machine feed mechanism.....H. C. Peters
Sewing machine feeding mechanism.....C. E. Hadley
Sewing machine thread cutter. Bag.....E. H. Burghardt
Sharpening mechanism. Tool.....C. Vogel
Sheet feeding machine.....H. K. King
Sheet metal pipe machine.....E. W. Edwards
Sheet separator. Pneumatic.....C. A. Juengst
Shelving bracket. Adjustable.....F. Palfrey
Ship construction.....C. G. Lundborg
Ship's course indicator.....C. P. Jones
Shutter fastener.....J. J. Quackenbush
Shuttle.....K. H. Sterrett
Sign. Vehicle destination.....2 pats.....J. Hotchner
Signaling and recording system. Automatic train.....F. R. Wood et al
Signaling. Submarine.....A. J. Mundy
Signaling. Wireless electrical.....M. I. Pupin
Signature gathering machine.....C. A. Juengst
Signatures or sheets. Curved plate for.....C. A. Juengst
Skis or hides. Treating pickled or tanned.....O. P. Amend
Smoke consumer.....W. I. Sherman
Snap hook.....W. P. O'Brien
Soil treating apparatus.....G. H. Adams
Soldering pad. Jeweler's.....J. E. Whitten
Sound direction finder. Submarine.....A. J. Mundy
Sound transmitter and receiver.....4 pats.....A. J. Mundy
Spark arrester.....W. S. Weimer
Spark arrester and fuel saver.....J. A. Crawford
Spindle.....2 pats.....V. Belanger
Spinning and twisting machine. G. W. Foster
Spinning or twisting machine thread guide support.....reissue.....L. T. Houghton
Spinning spindle.....J. E. Priest
Spirally wound tube.....W. E. Williams
Square. Miter.....R. A. Breul
Steam boiler.....G. H. Hok
Steam engine.....H. J. Staab
Steam separator.....J. Naylor, Jr
Steel. Producing open hearth.....H. Carisson
Stone. Apparatus for erecting buildings by molding artificial.....J. J. Dewey
Stone blocks. Press for molding artificial.....G. H. Rademacher et al
Stool.....P. Nash
Stove.....J. H. Lane et al
Stringed instrument pick.....C. F. J. Stokes
Suppository machine.....F. J. Stokes
Surfacing machine. Portable.....N. Hughes
Swaging tool.....A. Neilson
Switch and lock movement.....L. H. Thullen
Switch block.....I. B. Smith
Switch stand. High semaphore.....G. L. Mansfield
Syrup. Purifying.....M. Kowalski
Tag.....B. G. Merrill
Tank heater.....W. A. Disotell
Target apparatus.....J. L. McCullough
Tattooing device.....C. Wagner
Telephone.....J. W. Kurtz
Telephone exchange apparatus.....J. S. Ford
Telephone system. Party line.....T. C. Drake
Telephone transmitter.....A. J. Mundy
Telephonographic records. Means for intensifying.....E. E. Ries
Theophyllin. Making.....F. Ach
Thermostat.....C. L. Walker
Thrashing apparatus.....L. R. Mack
Tire grip tread. Pneumatic.....H. D. Weed
Tire heating device.....W. E. Henion
Tire heating machine or apparatus.....A. B. Drake
Tire. Pneumatic.....G. H. Hastings
Tobacco pipe.....J. D. Freeman
Tobacco pipe.....F. H. Bowly
Tongs. Adjustable.....J. W. Watson
Tool holder. Self-tightening.....E. S. Costa
Tool locking device. Pneumatic.....C. F. W. A. Oetting
Torpedo shells. Safety device for oil well.....W. H. Ernst et al
Torpedoes or other uses. Gyroscopic apparatus for steering.....F. M. Leavitt
Toy. Locomotive.....D. P. Clark
Track brake. Electric.....F. B. Corey
Track fastener.....C. H. Tibbetts
Trainstop. Automatic.....L. H. Thullen
Tripod.....A. R. Shullen
Trolley.....F. C. Sullivan et al
Trolley cord brake and take-up device. Automatic.....E. H. Amet
Trolley restorer.....E. L. Calahan
Trolley. Self-oiling.....F. Hachmann
Trousers hanger.....H. F. Norton
Truck. Transfer.....T. Fleming
Trunk. Sample display.....J. L. Tandy
Tubing or pipe joint.....D. F. Hurst
Turbine.....2 pats.....T. Eastmore et al
Turbine. Compound.....H. Wolke
Turbine. Steam.....B. M. Dutton
Twyer iron.....L. Silcott
Type casting and setting machine.....J. C. & J. C. Fowler, Jr
Typewriter.....F. Sholes
Typewriting machine scale and pointer mechanism.....G. M. Kitzmiller
Umbrella.....T. H. Plante
Universal joint.....J. C. Speirs et al
Universal joint. Incased.....C. W. Spicer
Unloader. Automatic.....W. C. Rastetter
Valve.....H. G. Ginaca et al
Valve. Air compressor piston.....G. J. Kennedy
Valve. Gate.....G. P. McArthur
Valve. Locomotive cut out.....W. A. Engle
Valve. Pressure reducing.....J. E. Taylor

Vapor burner.....A. H. Herron
Vehicle draft mechanism.....R. Ueltschi
Vehicle for running on roads or rails. Motor.....A. Collet
Vehicle spring.....C. H. Way
Vehicle wheel.....R. J. Cudmore
Vending machine.....W. Diebel
Vending machine. Automatic.....C. A. Wagner
Vending machine. Coin controlled A. Q. Allis
Vessel safety keel.....F. O. Stromborg
Wagon.....O. Olson
Walking stick.....G. J. Hennessy
Warp beam tension device.....G. Kellier
Washing machine.....C. Dietz
Watch cannon pinion.....C. Kuenzel
Watch movement.....C. Kuenzel
Welding apparatus. Chain.....J. W. Garland
Wheel.....F. H. Heitger
Wheel guide.....H. L. Stillman
Whiffletree coupling.....G. L. Miller
Wind-wheel and carousel. Combined J. S. Smith
Windmill.....M. B. Church
Window or door screen.....E. Christen
Window screen.....2 pats.....C. G. Woods
Wire stretcher.....W. M. Taylor et al
Wire stretcher.....I. M. Warner
Woven bag.....C. E. Knibbs et al
Woven fabric for underclothing, &c.....F. Lots et al
Wrapping machine cutting mechanism.....C. Owens
Wrench.....G. Purcker
Wrench and pliers. Combined E. L. Thompson
Wurtzillite. Treating and dissolving.....F. M. Whitall
X-ray tube stand.....G. R. Hogan
Zinc or other sulfids from their ores. Extracting.....G. D. Delprat

DESIGNS.

Bowl or similar article.....C. E. Haviland
Clocks, pictures, or similar articles. Frame for.....A. E. Seliger
Cup or similar article.....C. E. Haviland
Dish or similar article. 2 pats.....C. E. Haviland
Jug, pitcher, or similar article C. E. Haviland
Pencil holder.....H. Y. Otto
Pitcher or similar article.....2 pats.....C. E. Haviland
Plate or similar article.....C. E. Haviland
Plate, tray, or similar article.....C. E. Haviland
Sewing. Stand for articles used in.....J. J. Navo

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Addressing machine 2 pats E. P. Sheldon et al
Adjustable bracket.....A. Brees
Advertising device.....E. J. Bliss
Aerial vessel.....H. de Walden et al
Air brake.....J. F. Tipton
Air compressors or similar devices. Automatic governor for.....M. W. Hall
Air cooling apparatus.....C. Peacock
Air engine.....W. R. Pratt
Anchor. Ground.....W. W. Swan
Anchor. Ground.....S. P. Hick
Animal destroying means.....B. Parker
Animal trap.....H. J. Gaedke
Armature.....J. Burke
Asbestos millboards, slates, plates or tiles. Manufacturing or producing T. H. Iobson et al
Automatic dry covered seat F. E. Nedhaus et al
Automatic lubricator.....J. Snowdon
Automobile.....J. E. Kelly
Automobile mud guard.....F. Behre et al
Bails to receptacles. Means for attaching.....E. M. Geiger
Balance. Assay.....F. W. Thompson
Beam or arch. Structural.....T. P. Finlay
Bearing box.....S. W. Bradley
Bed bottom.....J. W. E. Faw
Bedstead canopy support.....I. E. Palmer
Bedstead. Folding.....S. W. Knott
Beer pipe cooler and protector.....A. F. Peterson
Bobbin.....3 pats.....V. Belanger
Boll-weevils. Compound for destroying.....G. C. Kitchen
Bolt puller.....A. J. Thatcher
Book. Manifolding.....H. H. Norington
Book rounding and backing machine.....A. Crawley
Boot or shoe cleaner.....W. S. White
Bottle cap.....E. Risse
Bottle filling apparatus R. G. & K. K. Wright
Bottle filling device.....R. G. & K. K. Wright
Bottle filling device.....I. Tordiff
Bottle filling machine.....F. C. H. Strasburger
Bottle. Non refillable.....G. H. Chandler
Bottle. Non refillable.....F. Franz
Bottle. Non refillable.....G. W. Shook
Bowling alley.....A. F. Griebel
Box fastener.....C. G. Black
Bread. Machine for making Swedish hard.....P. A. Soderholm et al
Bridle bit.....C. C. King
Bridle side cheek attachment.....D. McMillan
Brush.....W. Vanderman
Building block.....E. Tisch
Building block mold.....H. Loewe et al
Building block molding machine.....L. P. Normandin
Burglar alarm and locking device S. C. Lawlor
Burner.....A. G. Kaufman
Burner.....J. McFarlane
Butter pat forming machine.....E. O. Sutton
Button.....J. G. Breitenstein
Cabinet.....D. J. Sweet
Calculating device. Mechanical F. J. Anderson
Camera support.....M. Graf
Can capping machine.....F. A. Dixon
Cane and seat Combined.....F. H. Morse
Cap bar tip.....G. F. Payne
Car brake.....H. Hoffmann
Car brake rods. Brake jaw for.....A. Lipschutx
Car coupling draft rigging joint connection.....U. S. Drayer
Car coupling draw bar attachment. Railway.....J. A. Hinson
Car door. Freight.....J. R. Herndon
Car draft rigging.....M. S. Lucak
Car dumping mechanism. Metallic A. Becker
Car loading apparatus. Grain.....E. L. & A. C. Adams
Car. Railway.....J. W. Van Dyke
Car. Railway.....C. Fleischman

Car. Vestibule stock.....W. A. Buckner
Cars, &c. Device for rapid and accurate loading of railway.....F. K. Hoover et al
Cars. Electric lighting systems for.....H. Kreusler
Carbureter.....E. H. Baare
Carbureter.....S. C. Bruce
Carbureter.....W. Hooker
Carousel.....E. L. Appieby
Cartridge clip.....L. F. Bruce
Carving machine.....F. Streich
Casing spear. Trip.....C. T. Mapes
Cash register.....J. P. Clael
Castrating tool.....F. Starr
Catamenial pad.....J. L. Minges
Cement. Asphalt paving.....F. J. Warren
Chain wrench.....G. Amborn
Chain wrench.....G. W. Bufford
Churn.....W. Smith
Churn.....C. A. Janson
Churn.....A. M. Smithley
Cigar machine.....B. H. Suavely et al
Cigar tip cutter and advertising device.....A. & A. Iske
Cigarette and cigar making machine.....B. W. Tucker
Circuit breaker.....E. M. Hewlett
Circuit interrupter.....G. P. McDonnell
Clock pendulum adjuster.....J. R. Sims
Closet seat protector. Sanitary O. Thompson
Closet structure.....W. Griffiths
Clothing case and hanger.....D. A. Ryan
Clutch. Drill rod.....F. B. Stoner et al
Coasting device.....W. F. Clark et al
Coin containing packages. Paper carton for.....J. M. Johnson
Collapsible chair.....W. F. C. Weidenbaum
Collar. Horse.....J. N. Schmitz
Combinational chair.....D. Hoeck
Composition of matter.....G. H. Turnbull
Concrete block mold.....T. A. McMurtre
Concrete composition. Heat resisting and fire-proof.....H. L. Dunn
Controlling device for automatic players.....A. D. Palmer
Conveyer.....J. D. Brown
Conveyer.....I. Christ
Cork. Branded crown.....E. H. Baare
Cork branding machine. Crown.....E. H. Baare
Cotton compress.....T. J. Griffin
Counting apparatus. Electrical.....J. A. Kray
Cover and cigar cutter. Combined W. Pearce
Crane. Delivery.....G. W. Smith
Crucible and preheater. Combined.....J. A. Aupperle
Cuff holder.....W. H. Fulton
Culinary lifter.....G. L. Starr
Cultivator.....B. R. Brown
Cultivator shovel.....G. L. Bugardner
Current rectifying apparatus. Alternating.....C. M. Green
Curtain and shade hanger. Combined.....J. A. Hamelback
Cuspidor carrier.....C. H. Gunn
Cutter head. Rotary.....J. J. Quinn
Cutting machine.....A. E. Schuchert
Dam. Shell.....N. F. Ambursen et al
Dark room or cabinet. Portable.....B. W. Stewart
Dental appliance.....M. I. Schamberg
Derailing device.....O. J. Travis
Diseases by light rays. Apparatus for treating.....C. F. Stewart
Disinfecting apparatus for barbers' implements.....F. I. Fischer
Disk drill.....W. A. Lee
Display device.....J. H. Preston
Display stand. Sample sheet rotary.....G. H. Whaple
Distilling or refining hydrocarbon oils and spirits.....L. Gathmann
Distilling system and apparatus.....L. Gathmann
Ditching machine.....G. W. Bashaw
Door hanger.....W. Louden
Door or screen.....G. J. Record
Door spring.....A. C. Austin
Door stop.....R. R. Smith
Doors. Means for operating cellar or trap.....W. J. Symons
Draft producer and spark arrester.....A. C. Tolliver
Drawer guide.....F. C. Billings
Drawing instrument.....E. S. Johnson
Dry kiln.....2 pats.....L. Moore
Drying kiln.....H. J. Morton
Dust pan.....S. A. Alberston
Dye. Oxidizing sulfur.....H. J. Cooke
Dyeing composition.....G. M. Lawton
Eccentric.....W. A. Sanders
Electric accumulator.....C. de Sedneff
Electric arc furnace.....A. H. Imbert
Electric controller.....J. Lindall
Electric controlling system. Automatic.....W. Stockmeyer
Electric generators or motors. Revolving filed for.....W. A. Johnson
Electric heater or reostat resistance sheet.....G. L. Leonard
Electric meter.....T. Duncau
Electric motor controller.....F. C. Watkins
Electric starting box lever locking device.....G. W. Pierce
Electric switch.....G. J. Schneider
Electric time system.....D. Perret
Electric wave recording apparatus.....L. T. Robinson
Electrical apparatus.....F. Burks et al
Electrical choke coil.....G. S. Carson
Electrode for therapeutical purposes.....W. B. Bassell
Electrodes of arc lamps. Manufacture of.....M. Lilienfeld
Elevator or hoist.....C. A. Juhl
Elevator safety device.....E. Mosonyi
End gate hanger. Wagon.....F. M. Sturgis
End gate. Wagon buckling.....B. A. Faust et al
Engine gas mixing device. Gas.....E. Korting
Engine speed regulator. Explosive.....H. Soeldner
Engines, &c. Ignition apparatus for gas.....H. C. Folger
Engines. Starting vaporizer for explosive.....W. W. Tuck et al
Envelop.....J. T. Martin
Everet.....N. P. Peterson
Excavating machine.....A. McCarthy
Exhaust head.....J. E. Schlieper
Eyeglasses.....B. M. Levey
Eyeglasses.....L. F. Adt
Eyelet machine.....A. C. Campbell

Fabric pressing and finishing machine. Textile. T. Pratt et al
 Fan. Motor controlled. C. S. Warnock
 Faucet. Vented. W. L. Migget
 Feed water heater and purifier. J. H. Kingley
 Feed water regulator. A. Kollar et al
 Fence posts. Attaching means for securing wires to. T. W. Gladhill
 Fence. Wire. C. S. Beebe
 Fertilizer distributor and cotton seed planter. Combined. C. M. Huff
 Fibrous pads or batting. Making. G. Goldman
 Files. Following block clutch for card index or document. C. Zimmerli
 Filing drawer. J. F. Cordes
 Filing machine. 3 pats. F. C. H. Strasburger
 Filing machine valve. F. C. H. Strasburger
 Filing valve. F. C. H. Strasburger
 Filter. High pressure. W. S. Rawson
 Finishing roll. F. D. Stowe
 Fire extinguisher. Automatic. C. W. McDaniel
 Firearm. Automatic. T. C. Johnson
 Firearm forestock tip. T. C. Johnson
 Firearm. Recoil operated. T. C. Johnson
 Fishing tool. C. M. Heeter
 Flat iron. H. M. Horine
 Flat iron heater. W. J. Le Barron
 Flushing machine. F. J. Perkins
 Floor clamp. F. W. Hammond et al
 Flooring. Wood. J. J. C. Hasbrouck
 Fluid pressure regulator. W. J. Boekel
 Flushing device. Closet. J. M. Justen
 Fly paper. Machine for making sticky. B. E. Clark
 Fork and rake. Combined. C. Prangemeier
 Fumigating apparatus. F. O. Hawley
 Furnace. B. Hamilton
 Furnace charger. W. H. Freeland
 Furnace charging apparatus. Blast. W. Kennedy
 Furnaces. Mud gun for filling iron notches of blast. F. McCarthy
 Fuse plug. H. R. Sargent
 Game indicator. J. J. Poli
 Game set. R. Freeman
 Garbage receptacle. Tilting. J. D. Bragunier
 Garbage. Treating. A. J. Morse
 Garment supporter. A. W. Mensor et al
 Gas generator. Acetylene. D. H. Treichler
 Gas producer. W. J. Crossley et al
 Gas purifying apparatus. W. Everitt et al
 Gate operating device. J. N. Lyle
 Gearing. J. W. Miller
 Glass gathering machine. W. F. Altenbaugh
 Glass working machine. I. W. Colburn
 Glassware. Scalping. A. Grundstrom
 Glassware scalloping device. A. Grundstrom
 Glove. Boxing. A. F. Burt
 Grain drill attachment. M. Mitchell
 Grain steaming apparatus. P. Provost
 Gramophone. Electrically operated. T. Birnbaum
 Grate fender. E. C. Dickerson
 Grindstone hanger. M. Delgoff
 Guus. Alkaline lubricant for oiling. J. G. Wild
 Hair dressing rat. A. Cohn
 Hair drying apparatus. J. J. Nutt
 Hair drying device. L. Swain
 Hair holding device. J. Dougille
 Hammer throttle valve mechanism. Pneumatic. C. H. Haeseler
 Harness. B. A. Dunkle
 Harvester. Complete. J. & R. B. Morrow
 Heater. J. R. Barker
 Heating furnace. J. W. Arnold
 Hide or skin unhairing machine. F. J. Perkins
 Hide working and unhairing machine. R. F. Whitney
 Hoist. Lock. H. B. Walter
 Hoist. Barrel. H. J. Krumpelmann
 Hoisting apparatus. A. N. Hadley
 Hoisting device. H. J. Schmick
 Horse releasing device. E. A. Barnes
 Horseshoe calk. C. Lotbi
 Horseshoe calk. F. B. Gardner
 Hose supporter. A. W. Mensor
 Hulling machine. H. Kurth
 Hydrocarbon burner. A. C. Rush
 Igniter for explosive motors. Electric spark. L. J. Phelps
 Incubator. A. G. Smith
 Insulating electric conductor. 3 pats. I. Kitsee
 Iron and arsenic and making same. Soluble compound of. L. Spiegel
 Jar cover. F. P. Purdy
 Journal box. J. E. Cooper
 Kettle. Frying. C. M. Strickland
 Kiln car. Tunnel. A. A. Gery
 Knob and lock. Door. H. G. Voight
 Knob fastening. G. W. Roberts
 Ladder. Aerial. F. S. Seagrave
 Lamp. W. Tures
 Lamp. Electric. E. L. Elliott
 Lamp. Electric arc. M. F. Goodrich
 Lamp. Gas. A. H. Humphrey
 Lamp hanger. H. Giessel
 Lamp hanger. Street. A. W. Hutchins
 Lamp. Incandescent hydrocarbon. S. Grant et al
 Lamp. Oil. C. H. Hattan
 Lamp. Petroleum incandescent. J. Swoboda
 Lamp socket subbase. R. B. Benjamin
 Lamp socket. Weatherproof R. B. Benjamin
 Lamps. Device for protecting carbon filaments for incandescent electric. A. W. W. Miller et al
 Latch lifting devices. Manufacturing. E. A. Moore
 Lath forming machine. Metal. S. Davidson
 Lath forming machine. Metal. J. F. Malone
 Lavatory, water closet and cabinet. Combined. J. B. Legg
 Lawn sprinkler. H. F. Neumeyer
 Lens grinding machine. L. Wilhelm
 Letter sheet and envelop. A. A. Henderson
 Lifting jack. H. J. Schmick
 Linoleum cutting machine. E. J. Hemington
 Linotype machine. J. R. Rogers
 Liquid directing device. W. H. Brown et al
 Liquid fuels to motive power apparatus. Thermo-dynamic process of applying. P. K. Stern
 Liquids. Mechanism or apparatus for raising or conveying viscous. W. E. Pedley
 Loading and unloading apparatus for building levees, &c. C. H. Parker

Locomotive frame pedestal tie. F. J. Cole
 Locomotive or vehicle. Turbine driven. J. Wilkinson
 Loom for weaving looped or pile fabrics. J. R. Dennis et al
 Loom shuttle box. A. Heaton
 Loom warp-stop motion. J. Chaine
 Lubricating apparatus. E. W. Baird
 Lubricating device. E. A. Rix
 Lubricator. W. Alexander
 Match making machinery 2 pats. A. B. Calkins
 Mattress making machine. C. W. Meves
 Measuring instrument. Electrical. H. C. Snook
 Mechanical movement. W. S. Huson
 Metering system. T. Duncan
 Mine gate. J. P. Gowing
 Mines. Construction of frozen walls for shafts in. K. Schmidt
 Mining automatic bumper. Coal. F. Osha
 Mop and mop wringer. Combined. C. E. Shaw
 Motor generator. G. S. Dunn
 Motor starting device. Alternating current induction. H. S. Meyer
 Mowing machine. R. H. Hutchinson
 Mowing machine. R. E. Grant
 Mowing machine sickle grinding attachment. G. W. Durham
 Muffler. Head, face, and neck. B. Rantenberg
 Musical instrument. F. J. Stenger
 Neckwear fastening. A. W. Pithouse
 Newspapers, &c. Machine for feeding off. F. O. Brostrom
 Nurling tool holder. A. H. Reigner
 Nut lock. H. R. Romberger
 Nut lock. C. W. S. Turner
 Nut or pipe wrench. W. Van Horn
 Oil and steam separator. J. E. Schlieper
 Oil burner. A. A. Margeson et al
 Oil burner. Crude. F. T. Goodwin
 Oil waste press. A. T. Pierce
 Oscillaphone. W. W. Massie
 Oven. Baker's. G. S. Baker
 Oven. Baking. F. N. McCreary
 Oven. Baking. H. Harris
 Package closure. J. Graham
 Packages, boxes, &c. Separator follower for. F. E. Sagendorph, 2d, & B. J. Steinberg
 Padlock. E. T. Frain
 Painting machine. C. E. Bell
 Paper feeding machine. T. C. Dexter et al
 Paper feeding mechanism. A. H. Morton et al
 Paper machine. J. Walsh
 Paper making machines. Cleansing. I. Kitsee
 Pavement. A. E. Schutte
 Pavements. Laving. A. E. Schutte
 Pen cleaning device. Fluid. A. I. Thowless
 Pen. Fountain. H. W. Stone
 Penholder finger hold. B. B. Goldsmith
 Pencil holder. A. R. Eldredge
 Photographic screens. Making. B. S. Krupp
 Piano action. J. L. Wilson
 Pipe wrench. Chain. G. Amborn et al
 Planter. Seed. W. G. Daniels
 Planter. Seed. E. M. Heylman
 Plow planter attachment. A. Broomfield
 Plow planting attachment. D. Gordon
 Plow. Shovel. W. G. Tower
 Plug switch. J. I. Ayer
 Poke. Animal. A. Crosbie
 Polishing bag. J. L. Guyon
 Polishing machine. W. S. Bower
 Polychloral and making same. S. Gartner
 Post driver. Portable. G. H. Heiser
 Pot or kettle supporting foot or rest. G. W. Norwood
 Potato digger. W. F. McNamire et al
 Potato sorter. O. P. Hallock
 Pouring and filtering apparatus. E. Keller et al
 Power apparatus. F. Hamache
 Power set works. H. McCleary
 Power transmission device. P. N. Nelson
 Printing conductors' reports, &c. Machine for. W. I. Ohmer
 Printing press delivery mechanism. J. F. Haan
 Printing press numbering attachment. J. Rowe
 Protector driving machine. 2 pats. B. F. Mayo
 Pulley. Expandable. P. H. Shue
 Pulley. Sash. W. N. Packer
 Pulley. Split. S. C. Hitchcock
 Pulverizer. W. M. Russell
 Pump. Centrifugal. K. Schoene
 Pump diaphragm. E. George, Jr
 Pump operating mechanism. C. P. Bilson
 Pump rod attachment. F. G. Reeves
 Punching machine spacing table. J. V. W. Reynders et al
 Puzzle. G. S. Andrews
 Radiator. A. G. Bayles
 Radiator. Steam. G. W. Johnson
 Rail joint. J. Campbell
 Railway brake. Electric. L. L. Stamm
 Railway construction. Dock. E. W. Funk
 Railway cross tie. W. F. Ellis
 Railway rail. T. G. Aultman
 Railway signal. J. P. Coleman
 Railway signaling apparatus. E. C. Carter
 Railway signaling system. G. W. Watkins et al
 Railway spike lock. E. C. Winters
 Railway stub switch. J. G. McKeown
 Railway switch. W. S. Weston
 Railway switch. M. Barnes
 Railway switch lock. Automatic. W. E. Harris
 Railway system. C. B. Vovnow et al
 Railway tie. G. W. Gulleddge
 Railway tie. F. H. Alfred et al
 Railway tie and rail fastening. Combined. J. W. Dowell et al
 Railway tie. Metallic. H. W. Avery
 Railway tie. Metallic. A. R. Keene
 Railway track supporting device for bridges, &c. J. B. Strauss
 Razor frame. Safety. A. W. Schenber
 Reed for weaving, &c. Compressed. G. E. Hoyle
 Refrigerating apparatus. J. Patten
 Refrigerating apparatus for use in connection with fermenting operations. Automatic. W. von Rougemont
 Retapping or nut sizing machine. P. Krepp
 Roasting furnace. O. Hofmann
 Rock drill. H. Dietz
 Rotary engine. J. T. O'Brien
 Rotary engine. C. Hendricks
 Rotary engine. Elastic fluid pressure. J. A. Torrens
 Rubber article having necks or protections. Hollow. I. F. Kepler
 Rubber bag body. I. F. Kepler
 Rubber sheets or strips. Machinery for preparing. E. F. Ackerman
 Rule. Slide. F. J. Anderson

Sand or dirt. Apparatus for recovering values from. C. G. Poppenberg
 Sash frame and sash. J. G. Roseboom
 Sash lift and fastener. Combined. W. N. Packer
 Sash lock. W. C. Brinkerhoff
 Sash lock. Ventilating. W. N. Packer
 Saw mill tension mechanism. Band. E. E. Thomas
 Saw protector. Rippling. J. A. Jackson
 Saw tooth shaping machine. J. & D. D. McMaster
 Scraper. Road. E. A. Wright
 Sewer coupling. M. Dillenburgh
 Sewer pipe cleaning apparatus. W. H. Stewart
 Sewing machine cabinet. W. Person
 Sewing machine needle bar connection. C. M. Abercrombie
 Sewing machine. Overseam. C. Necker
 Shade roller hanger and adjuster. C. L. Sanford
 Shade support. Adjustable window. J. A. Thain
 Shaft coupling. G. R. Rich
 Sharpening machine. Razor. A. W. Schenber
 Sheet delivery mechanism. H. A. W. Wood
 Shingle sawing machine. J. L. Poston
 Shirt waist holder and skirt supporter. F. K. Ottenheimer
 Shoe polishing implement. W. W. Worcester
 Sign. Illuminated. 2 pats. J. Hotchner
 Signaling. Submarine. J. B. Millet
 Sink strainer. H. G. Lawrence
 Skirt supporter. M. McPherson
 Smoke consuming furnace. J. A. Crawford
 Snap hook. G. H. Nearing
 Snap hook for jib stays. J. Wallace et al
 Snow plow. A. Labelle
 Snow scraper. C. M. Hopper
 Snow shovel and melter. J. A. Wiedersheim
 Soap sample mounting. R. Brown
 Sound transmitters. Hygienic appliance for. T. R. Owen
 Spade and pickax. Combined. C. Prangemeier
 Spectacle case. H. A. Holibaugh
 Speed mechanism. Variable. W. D. Custead
 Spike extractor. E. Bebler
 Spindle. V. Belanger
 Spinning apparatus. Ring. G. O. Draper
 Spring cushion. E. Denegre
 Square, bevel, leveling and plumbing instrument. J. W. Fletcher
 Stackers. Grain saving device for pneumatic. E. Tacin
 Stairway. J. Kulhanek
 Stamp mill. J. C. Able
 Stand boiler. I. F. Kroderer
 Starch. Making soluble. J. David
 Steam trap. P. Fraser
 Steel cutters, &c. Apparatus or furnace for hardening. S. N. Brayshaw
 Stocking suspender. A. Breese
 Stone plates, slabs or tiles. Manufacturing imitation. L. Hatschek
 Stove mat. Z. T. Hall
 Strength testing apparatus. J. Maitland
 Stump puller. D. J. McMillan
 Suspenders. I. Wechsler
 Switch rod mechanism. 2 pats. H. G. Elfborg
 Synchronizing apparatus. Automatic. M. C. Canfield
 Tablet. Writing. J. P. Dorr
 Telegraphy. Wireless. H. C. Snook
 Telephone or like circuit contact. W. A. W. E. Hirth
 Telephone substation outfit. E. E. Yaxley
 Telephone switchboard supervisory signal apparatus. J. L. McQuarrie
 Thread brake. H. A. Bates
 Tiles. Machine for molding cement roofing. H. Baden et al
 Tiling machine. J. T. Crossley
 Tire. O. L. Leach
 Tire. Pneumatic. J. Parnley
 Tire. Vehicle. J. H. W. Fitzgerald
 Tongue support. Two wheel. A. H. Weaver
 Tools. Feed and speed changing device for machine. R. K. LeBlond et al
 Toy piano. N. H. Colwell
 Toy riding horse. W. S. La Londe
 Transit solar attachment. D. H. Blossom
 Trolley. L. F. Forrester
 Trolley controlling device. Automatic. H. W. Nichols et al
 Trolley. Electric car. L. M. McBride
 Trolley harp. W. W. Hoffman
 Trolley pole controller. M. O. Dolson
 Trolley retriever. W. W. Hoffman et al
 Trolley wheel. F. Strail
 Trolley wire hanger. A. Neubert
 Trolley wire suspension. M. T. A. Kubierschky et al
 Trolley wires. Crosstown arch for intersecting. A. Neubert
 Truck bolster. Car. J. M. Hopkins
 Trunk. Wardrobe. F. H. Parkhurst
 Tube expander. H. G. Grotz et al
 Turbine. D. F. Asbury
 Turbine bucket. H. Geisenhoner
 Turbine. Elastic fluid. O. Junggren
 Turbine generator. W. L. R. Emmet et al
 Type carrier. Cylinder press. C. S. Rosin
 Type. Rubber. J. S. Duncan
 Umbrella notch. T. R. Hyde, Jr
 Valve. F. Sticker
 Valve. Brake or other. M. W. Hall
 Valve mechanism. H. Walther
 Valve. Triple. N. A. Christensen
 Vehicle brake. W. Swisher
 Vehicle brake. G. E. Baumberger et al
 Vehicle brake mechanism. H. Dixon
 Vehicle. Motor. R. L. Morgan
 Vehicles. Driving mechanism for self propelled. E. Thomson et al
 Vending machine. Automatic. J. C. Dougherty et al
 Veneer cutting machine. C. B. Allen
 Vessels to moorings. Means for securing. A. J. Maclean
 Vestibule diaphragms. Means for attaching. H. H. Schroyer
 Vise. Bench. M. G. Lewis
 Wagon. Lumber. D. W. Strickland
 Water closet. F. C. Zacharie
 Water closet flushing tank. C. H. Phillips
 Watering device. Stock. F. C. Mudd
 Water power apparatus. J. H. Smith
 Welding machine. G. B. Walker
 Wells. Tool for making deep. C. M. Heeter
 Wheel. J. H. White
 Whiffletree hook. A. E. Sutton
 Wind instrument mouthpiece. T. Hennessey
 Wind wheel regulator. F. T. Jacobs

Window. O. M. Edwards
 Window controller and lock. G. McDowell
 Window screen. S. D. T. Manning
 Wire drawing appliance. D. Henderson
 Wire stretcher. A. A. Smith
 Wire working tool. J. Rossi
 Wires in sleeves. Tool for inserting. H. Beaudette
 Wires. Waterproof entrance bushing for. W. B. Hopkins
 Wool forking, elevating, and conveying machine. J. H. Tillinghast
 Wrench. I. E. Stump
 Wrench. P. S. Larson
 Zinc. Cleaning sheet. J. Nelson
 DESIGNS.

Asparagus holder. A. Hepner
 Carpet. H. H. Hunt
 Carpet. C. F. Romieu
 Carpet. 2 pats. W. E. Sayers
 Glass. Sheet. R. A. B. Walsh
 Hip strap drop. J. A. Buckstaff
 Stove cover. Heating. E. B. Adler
 Stove. Gas. W. M. Crane
 Stove top. Heating. E. B. Adler
 Water heater. H. J. Blauke

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MECHANICAL PATENTS.

Adhesive. A. P. Anderson
 Aging liquors. Machine for. T. R. Timby
 Air and hand brake. Combined. A. G. Sandman
 Air currents. Means for observing dust-laden. A. Lotz
 Angle meter. L. T. Moffett et al
 Animal sears. C. W. Manlove
 Ash separator. J. Jackson
 Automobile sleigh. F. Hartom
 Bag holder and truck. Combined. C. W. & A. E. Parks
 Baling press. W. E. Elam
 Balloting machine. W. M. Dougherty
 Bath apparatus. Shower. J. D. Caldwell
 Bearing for turn tables or the like. E. S. Bennett
 Bearing. Lubricated. C. C. Chinn
 Bevel. E. A. Schade
 Binder frame. L. A. Jones
 Boards of different widths. Device for assorting. T. B. Rice, Jr
 Boat. G. W. C. Lomb
 Boat. Life. R. D. Mayo
 Bobbin clutching means for rotatable spindles. W. E. Allen
 Boiler fire box. Steam. W. H. Thornley
 Boiler flue work. Apparatus for. J. W. Faessler
 Bolt clipper. F. A. Roberts
 Bone black drying apparatus. M. Weinrich
 Book holder. D. E. Hunter
 Bottle. S. Kosanovich
 Bottle closure detaching device. J. R. Harrison
 Bottle. Non refillable. W. H. Pearson
 Bottle. Non refillable. W. G. Lawrence
 Box cover supporter and holder. W. H. Kidder
 Box handle and fastener. Lunch. J. D. King
 Brake. J. D. Kelley
 Brake beam. C. F. Huntoon
 Bread forming machine. C. A. Meurell
 Bread mixer and kneader. C. F. Smith
 Bread pricking machine. C. A. Meurell
 Brooder. J. Purdy
 Broom bride. A. Callahan
 Broom holder. G. E. Crafts
 Brush holder. W. L. R. Emmet
 Brushes, brooms, hammers, picks, mortise joints or the like. Fastener for securing. J. W. Crook
 Building block. G. Geraedts
 Building block mold. J. A. Ferguson
 Button lathe and drill. E. M. Derniston
 Button. Separable link. F. P. Barney
 Cable traction system. A. Painter
 Calcining alumina sulfate, &c. A. E. Cummer
 Calculating machine repetition means. K. Kelling
 Calipers. Micrometer. F. Spalding
 Camera. Photographic. M. Niell
 Can opener. G. H. Jaquith
 Can opener. E. Novak
 Car brake. A. G. Sandman
 Car brake. Automatic. C. F. Pierce
 Car, &c., brake. Mine. C. J. Gustafson
 Car brake. Railway. E. A. Wagoner
 Car coupling. J. R. Deisher
 Car door. Grain. E. Huber et al
 Car loading and unloading attachment. Railway. O. T. Kemp
 Car register operating mechanism. W. I. Ohmer
 Car. Scenic railway. V. Rosenberger
 Car step. E. J. Douglas
 Car. Summer. E. Bury
 Car tandem spring draft rigging. Railway. W. H. Miner
 Cars. Card or label holder for the home routing of. V. H. Cain
 Caramel cutting and wrapping machine. W. B. Page et al
 Carcase hanger. P. J. Shannon
 Carpet stretcher. M. E. Shinn
 Cash carrier systems. Cash box for pneumatic. C. A. Pfleger
 Cement. Making hydraulic. F. W. Brown
 Channel cutter. W. H. Sipe et al
 Churn. T. T. & R. T. Dunn
 Clasp. W. Cahn et al
 Cleaning and waxing pad. H. Greeder
 Clock arbor, &c. T. W. R. McCabey
 Clothes line grip. J. Mandrey
 Clothes line. Pinless. R. W. Ivey
 Clutch. Friction. J. W. Packard
 Coat front stiffener. C. W. Schweichler
 Cock or faucet. M. J. Ryan
 Cock or faucet. E. L. Walter
 Coin controlled apparatus. W. R. Verstraeten et al
 Coke oven. J. H. Bowling
 Coking coal. C. F. Spaulding
 Collar. Solit set. H. C. Cowen
 Column. Metal work. T. L. Sewell
 Combination lock. W. H. Bright
 Composing stick tilter. S. Lack
 Composition of matter. E. Davenes
 Concentrator. Drip. C. F. Du Bois
 Condenser. M. A. Herold
 Condenser. Vacuum pan. J. F. Utrilla

Confectioner's stirring and froth beating machine.....H. Munding
Connection box.....F. E. Cae
Copying press rack.....W. Plunkett
Corer and divider, Fruit.....U. A. Bowman
Corn ears for feed, Machine for crushing.....J. M. Rankin
Corn husker.....E. Vladescu
Corn husking machine.....A. Rosenthal
Corn stubble cutter.....J. H. Sharp
Corner iron for siding joints.....J. Simpson
Cotton picker, Hand.....J. S. Murdoch
Cotton picker's truck.....J. W. Stow
Crate, Shipping.....E. L. Hammond
Cuff holder.....A. C. Van Kirk
Culinary operations, Machine for use in.....M. E. Juergens
Culinary vessel.....H. Seipelt
Curling iron heater.....J. F. McCleary
Current generators and circuits, Regulating alternating.....L. Gutmann
Curtain pole.....C. A. Albert
Curtain ring.....J. W. Leslie
Cut off spout, Automatic water.....J. M. Hill
Cycle driving mechanism.....C. E. Dould
Cycles or cars, Gear for belt driving motor.....D. W. McLean
Dental suction plate.....E. C. Reed
Dentist's implement.....L. H. Zeran
Derrick, Machine for use in connection with.....R. Lahey et al
Desk, Roll top.....H. A. Abrahams
Disintegrator.....W. Cox
Disk drill.....W. A. Van Brunt
Display box easel support.....C. W. De Laney
Display hanger.....C. A. Rosburg
Display holder.....O. A. De Long
Display rack or holder.....S. Kraus
Display stand for sanitary fixtures B Fanning
Distillation apparatus, Wood.....J. A. Mathieu
Door check.....H. Van Blarcom et al
Drawing board.....A. Krah
Drying apparatus.....M. Bertrand
Drum.....J. Buhr
Dust box.....W. H. Gentry
Earth moving apparatus.....D. M. Nesbit
Electric circuit closer.....J. K. Norstrom et al
Electric circuit regulation.....H. R. Sargent
Electric conductor cleat.....H. R. Sargent
Electric furnace.....M. R. Conley
Electric generator brush holder.....L. R. Smith
Electric light or motor circuits, Audible indicator for.....J. P. Gillette
Electric motor controlling and regulating means.....G. Rennerfelt
Electric signal.....W. T. Wheeler
Electric switch time limit device.....S. B. Stewart, Jr
Engine drive wheel, Traction.....J. J. Mally
Envelop, Double return.....J. Q. Dixon
Evening, Three horse.....S. A. Massey
Expansion bit.....W. J. Uschold
Eyeglasses.....H. Masters
Eyelet.....E. Kempshall
Fabric, Apparatus for handling tubular.....C. W. Gove
Fan.....S. R. Bachtel
Fastener.....W. E. Coles
Feed mechanism.....C. J. Bellamy
Feed, Steam boiler water.....T. M. Wilkins
Feeder, Boiler.....H. H. Lyon
Feeding appliance, Animal.....B. Bayghman
Feeding mechanism.....C. J. Bellamy
Fence.....J. A. Odell
Fence fabric, Wire.....T. Litwiller
Fence stretcher and post, Combined.....J. W. Hutchison
Fence, Wire.....W. N. Parrish
Filling apparatus.....J. A. Allardice
Filter.....E. Boelinghaus
Filter.....F. B. Hinkson
Finger ring.....F. R. Stafford
Fire finishing machine.....H. L. Bock
Firearm cylinder latch, Revolving.....O. W. Ringqvist
Firearm, Magazine.....W. M. Vandegrift
Firearm, Single trigger.....H. E. Winans
Fireproof flooring, Manufacturing.....C. Plafow
Fireproof wall, Interiorly ventilated.....L. D. Ewing
Fish line drying reel.....C. A. Laughton
Fishing reel.....W. L. Atkinson
Flat iron.....H. Goldberg
Flat iron waxing and cleaning device.....J. Bayer
Flexible screen.....P. H. Wilson
Flexible tube.....M. M. Waterman
Floor oiler.....2 pats.....G. H. Garnet
Floor tread.....W. J. Tonkin
Flour, Treating.....J. M. Williams
Flue cutter.....C. Gabriel
Fluid pressure engine.....S. W. Brainard
Flushing tank.....A. Adams
Fly catcher.....J. Schnell
Forge, Portable.....J. Reilly
Formaldehyde hydrosulfites and making same.....L. Descamps
Foundry system.....G. W. Packer
Fruit dryer.....H. A. Hoover
Fruit gatherer.....J. A. Danseu
Furnaces gases and simultaneously reducing ores, Utilizing waste.....J. Herman
Furnaces, Constructing smelting.....J. B. McGee
Furniture self leveling apparatus.....G. W. & R. W. Bostwick
Furniture trimming fastening device.....C. D. Reeve
Furniture trimming fastening device.....D. W. Tower
Game apparatus.....H. Zeip
Garment hanger.....L. F. L. Pyncheon
Garment hook.....M. E. Gross
Gas burner.....W. T. Roberts et al
Gas burner for heating.....L. Kann et al
Gear wheel controller, Spring actuate.....A. Hillgren
Glass, Drawing.....L. Thornburg
Glass etching machine.....J. S. Lucock
Glass working machine.....I. W. Colburn
Gold from ores, &c, Extracting.....H. S. Stark
Governor, High speed inertia.....J. Wilkinson
Grain binder knot tying device.....W. Jenkins
Grinding machine.....J. F. Buckley
Gun carriage, Disappearing.....R. Rausenberger
Gun sight.....J. Kurig
Harness ring.....C. F. Reynolds
Harp holder.....C. F. Sutter

Harrow.....S. M. Ford
Harvester, Cane.....A. O. Pesson
Harvester, Corn.....R. B. White
Harvesting machine.....R. Holland
Harvesting machine.....J. A. Carlson
Harvesting machine.....C. Eyster
Hat, Large crowned.....F. J. Muhlfeld
Hat rack, Locking.....G. Nattermann
Hat stand.....S. P. Hanson
Hat stretcher and shaper.....T. E. Gray
Hay carrier.....W. Loudon
Headlight electrode holder, Electric.....M. A. Ross
Head rest attachment.....J. D. Smock
Heat transferring device, Rotating.....L. von May
Heating apparatus.....O. S. McCurdy
Heel attachment for boots or shoes.....G. F. Fischer
Hermetically sealed jar.....J. A. Kray
High potential energy detector.....J. D. Hillard, Jr
Hoisting bucket take-up device.....E. B. Perry et al
Holdback, Vehicle.....O. M. Knox
Horns, Manufacturing.....E. A. Schoettel
Hose pipe or nozzle.....D. Fisher
Hose supporter.....2 pats.....M. B. Hammond
Hot water heater.....L. F. Pucker
Hot water heater.....J. A. Copridge
Hydraulic press.....O. Philipp
Ice handling tool.....A. R. Selden
Illuminating effects, Apparatus for producing.....O. Junghans
Incandescent burner.....H. B. Cox
Incandescent mantle.....M. Offenbergl
Incubator brooder.....C. H. Sperle
Influence machine.....I. W. Detwiller
Inking device.....W. J. Sheetz
Internal combustion engine, Gas or other.....D. Clerk
Ironing board and cabinet.....H. A. Plimpton
Ironing table.....W. J. Higgs
Jaw closure.....W. B. Fenn
Joint band.....J. C. Raymond
Journal bearing.....G. H. Clamer
Journal box dust guard.....T. H. Symington
Key holder.....F. G. Vancore
Knife handle fastening.....G. W. Hodges et al
Knife spring, Pocket.....E. Hammesfahr
Knitting machine stop motion.....W. Hammond
Label holder.....P. H. Yawman
Labels, &c, Spring hook clip for securing luggage.....J. F. Wilson et al
Lace fastener, Shoe.....F. E. Dunnett
Lace holder.....J. F. Markes et al
Lace making stand or device.....C. Sander
Lace making stand or device.....L. F. Earl
Lacing hook setting machine gage.....J. Perrault
Lacing stud.....E. E. Streed
Ladder.....P. F. Wagner
Ladder and ironing board, Combination step ladder, Scaling.....W. F. Sampson
Lamp, Electric.....E. W. Rice, Jr
Lamp, Inclosed electric arc.....H. C. F. M. Pettididier et al
Lamp supporting means, Electrical.....W. B. Churcher
Lamps, Apparatus for automatically lighting or extinguishing street or other gas.....J. Bergan
Lard press sheet metal cylinder.....C. G. Garrigus
Lathe turning tool.....J. Hartness
Legging and boot, Automobile.....A. Helibroner
Letter, Lighted.....A. Anzeric
Liquid meter.....R. Lohse
Loading apparatus.....F. C. Jacoby
Lock and latch, Combined.....W. L. Frazer
Locket.....F. W. Moore
Locomotive boiler.....J. Muhr
Logging hook, Double.....R. P. Aubrey
Loom filling detecting means.....A. E. Benson
Loom filling feeder, Filling replenishing.....E. S. Stimpson
Loom filling replenishing mechanism.....B. J. Dobbins
Loom jacquard mechanism.....J. Wadsworth et al
Loom lay bearing support.....J. McFethreis
Loom picker checking means.....E. S. Stimpson
Loom shuttle checking means.....J. Northrop
Loom take up mechanism.....G. E. Anderson
Loom warp stop motion.....V. A. Ledoux
Lubricating systems, Indicating the flow of lubricants in forced.....P. T. Houston
Lubricator.....H. F. Bickel
Lubricator.....A. G. Puerner
Lumber handling apparatus.....G. E. Dupee
Mail bag catching and delivering device.....C. W. Murdoch
Mail marking machine.....W. Barry
Marine hull.....T. H. Smith
Massage roller.....E. Blanchard
Matrices, Machine for manufacturing justified line.....F. A. Johnson
Measuring instrument.....W. J. Muncaster
Mechanical movement.....J. Sheline
Metal mold.....W. C. Norcross
Metal tank.....E. E. Norcross
Mine curtain.....R. J. Good et al
Mining machine, Placer.....N. W. Pulsifer
Mining machinery.....E. S. Bennett
Mirrors and laryngoscopes, Illuminant attachment for head.....A. F. Watch
Miter box.....R. H. Dorn
Motor compressors, Knockdown inclosure for.....W. H. Nightingale
Motor water cooling system, Explosion.....H. Austin
Mowing machine.....C. H. Hewer
Music leaf turner.....R. C. Elliott
Musical instrument.....J. Zandalazini
Musical instrument bridge.....D. Grover
Musical instruments, Valve for pneumatic actions for.....M. S. Wright
Neckwear, Men's.....J. H. Stark
Note sheet.....W. R. Verstraelen et al
Nut locking device.....S. T. Parker
Nut press.....E. Peters
Oils, Treating.....A. C. Calkins
Ore concentrator.....G. E. Perkins
Ore concentrator.....I. A. Cammett et al
Package can.....M. & P. Shalita
Packing, Metallic.....J. J. Redner
Packing, Rod.....O. J. Garlock
Pail attachment.....G. Falk
Painting apparatus.....J. J. Allen
Paper box creasing apparatus.....D. J. Rex

Paper or parcel holding device.....W. Brewster
Pay out machine.....J. Pfeifer
Peat brick manufacturing machine, B. Kittler
Peat with recovery of by products, Oven for coking.....E. Bremer
Pen, Fountain.....P. Molin
Pen, Fountain.....H. M. Mannheim
Pen, Stylographic.....D. W. Beaumel
Phonographs or graphophones, Sound controller for horns of.....M. J. O'Connor
Photographic plate holder.....W. F. Sidelinger
Photographic printing apparatus.....H. H. McIntire
Photographic printing apparatus.....J. Hinne
Phototherapeutic apparatus.....W. F. Arnold
Picking device.....W. R. Verstraelen et al
Pipe coupling, closing device, and drain attachment.....A. H. Hicks
Pipe joint construction.....M. Kronauer
Pipe rack.....R. King
Pipe union.....W. S. Kemper
Pistol case.....V. C. Brannon
Piston.....D. W. Porter
Piston and piston rod.....S. W. Brainard
Plane.....E. A. Schade
Planer driving mechanism, Metal G. A. Gray
Planter, Seed.....R. M. Hood
Plow.....F. J. Smith
Plow propeller, Hand.....L. W. Avant
Plow, Reversible.....W. G. Jobling
Polishing wheel.....J. W. Faessler
Powder container closing device.....L. A. Allen
Precious metals from their ores, Extracting.....S. C. C. Currie
Press.....W. E. Elam
Pressure regulator.....A. Kleinfeldt
Printing form, Endless.....H. G. Bender
Printing machine, Blue.....S. B. Whinery
Printing press inking roll mechanism.....J. H. Schussler
Printing presses or other machines, Reel carrying apparatus for web.....G. W. Mascord
Propeller.....H. Enge
Propeller, Screw.....C. A. Manker
Propelling vessels.....L. Audrieth
Puff comb.....B. W. Doyle
Pulley mechanism for line shafts, Loose.....J. K. McNeill
Pulley, Split.....G. Simmons
Pulverizing machine, Land O. A. McFadden
Pump.....E. S. Stewart et al
Pumping engine, Duplex.....S. H. Bunnell
Puzzle.....E. S. Ross
Puzzle.....E. A. Cannon
Pyroacetic spirit, Apparatus for producing.....A. Ippendorf
Pyrometer.....H. M. Tory et al
Quartz mill.....C. E. Humphreys
Rag picker feed roller.....L. Bredannaz
Rail joint.....H. S. Mann
Rail support.....W. Lovell
Railway block switch and signal system, Electric.....T. F. Gaynor
Railway cross tie, Metal.....A. Newell
Railway or tramway, Monorail or like C. Joly
Railway switch.....W. Wharton, Jr
Railway switch, Electric.....S. C. Gurley
Railway switches, Electric signal light for.....J. McFell
Range top burner, Gas.....W. J. Clark
Reducing and pointing machine, Automatic.....E. W. Morehouse
Reed for weaving, &c, Compressed G. Hoyle
Registering mechanism.....J. Schiuneller
Rest device.....R. W. Schroeder
Rheostat, Starting.....F. Mackintosh
Road making material, Machine for cleaning and separating.....J. J. Everson
Rock drill.....W. Brady
Roof covering.....J. H. Munro
Roofs, Laying.....J. H. Munro
Rope clamper, Automatic.....N. H. Fuels
Rotary engine.....J. M. Powell
Rotary gas engine.....L. D. Toivier
Rubber tread.....P. W. Pratt
Rumble.....W. W. Sly
Sack holder.....J. H. Beltz
Safe.....B. F. Sparr
Safe or vault.....J. Paton
Sash fastener.....S. M. Berry
Sash lock and adjuster, Combined R. De Lan
Sash lock, Automatic.....A. Johnson
Saw, Band.....C. Seymour
Saw, Metal cutting.....J. M. Bradley
Saw set.....F. Huot
Sawing machine, Hack.....H. A. E. Liebert
Scaffold support.....W. J. Murray
Scale, Weighing.....O. N. H. J. Brolette
Scene shifting mechanism.....H. S. Thomas
Screw making machine.....E. C. Henn
Seasickness, Apparatus for the prevention of.....C. Brendel
Secondary or storage battery.....C. Potter
Sediment removing composition.....J. B. Bruckmiller
Seed cleaner attachment, Cotton.....R. T. Cook
Sewing machine, Bag.....J. F. Ames
Sewing machine, Overseaming.....H. A. Miller
Sewing machine reversible feed mechanism.....W. A. Smith
Sewing machine, Shoe.....A. E. Ayer
Shade bracket.....W. O. Weed
Shingle gage, Adjustable.....L. Stowell
Ships' bottoms, Device for cleaning.....J. Forrest
Ships, Device for minimizing oscillatory movements of.....E. O. Schlick
Shirt waists, Device for holding down.....A. E. Dunbar
Shock loads.....E. Carroll
Shoes, Manufacture of turned.....W. Hubrich
Shower ring.....W. H. Lawrence
Sifter, Ash and coal.....M. Cossoy
Sign, Illuminated.....A. L. Brown
Signal transmitter, Electrical.....A. C. Ferguson
Signaling apparatus, Train.....J. Seel
Signaling system, Electric.....P. H. Schmitt
Sinkers.....G. H. Reis
Slatting.....J. H. Monro
Slicer and meat tenderer, Vegetable.....J. M. Holcomb
Snow and ice from pavements, Device for removing.....J. Sibbald
Soap mold.....C. Langguth
Spiral spring.....A. E. Terry
Spoon.....P. J. Sweeney
Spoon, Mixing.....H. T. Sidway
Spring mechanism, Friction.....P. Hien
Sprinkler and support therefor.....L. Secord

Stacker and loader, Hay.....T. A. Williams
Stacker, Hay.....M. Addy
Stacker, Hay.....J. H. Cope
Stamp affixing machine.....J. Atkinson
Steam generator.....W. D. Hoxie
Steam generator, Water tube.....J. Koster
Steam separator.....C. E. Huxley
Steam superheater.....J. Bjornstad
Strainer, Waste hole.....J. H. Doyle
Sulfuric anhydrid, Making.....H. S. Blackmore
Surgical cot, Adjustable.....S. A. Wright et al
Surgical instrument.....F. E. Leavitt
Surgical pad.....W. E. Ambrose
Surveying instrument attachment.....E. R. Armstrong
Swing.....2 pats.....A. P. Boyer
Swinging gate, Adjustable.....G. W. Snyder
Switch operating device.....C. W. Townsend
Table.....C. H. Nielsen
Teaching reading and sending telegraph messages, Device for.....D. C. Williams
Telephone.....W. B. Churcher
Telephone or telegraph system.....F. E. Denzer et al
Telephone receiver.....R. H. Manson
Thermal cut-out.....W. L. R. Emmet
Thermometer.....W. F. Fruehauf
Ticket protector, Pin.....L. E. Hachelle
Time lock.....E. A. Marsh
Tire.....A. Papeux
Tire and fastener therefor, Vehicle.....W. O. Worth
Tire, Rubber.....A. S. Krotz
Tire welding clamp.....C. S. Blaker
Tobacco pipe.....R. S. Koch
Tongue, Vehicle.....P. Furst
Tool, Combination.....F. Spalding
Tool handle.....W. B. Swan
Tool handle.....H. S. Southall
Tooth, Artificial.....F. L. Priest
Toy support.....J. M. Ankers
Tripod.....W. S. McKinney
Trolley for electric railways, Self-adjusting.....C. C. Benson
Truck, Car.....R. C. Wright et al
Truck construction, Car.....R. C. Wright et al
Truck frame, Car.....R. C. Wright et al
Tumbler washer.....A. Satterfield
Turbine.....L. E. Truesdell
Turbine.....O. Junggren
Turbine governing mechanism.....O. Junggren
Turbine, Marine steam.....C. A. Parsons
Turbine of the multiple expansion type.....C. E. L. Brown
Turbine, Steam.....G. Zahikjanz
Twine cutter.....F. Boszhardt
Valve for compound locomotives, Starting.....R. Schultheiss
Valve gear for fluid pressure engines.....E. E. Arnold
Valve, Popsafety.....H. P. Tippet
Valve, Puppet.....H. Holzwarth
Valve operating mechanism.....E. E. Arnold
Vault, Burial.....J. W. Brandenburg
Vehicle.....E. J. Pennington
Vehicle attachment.....A. Obitz
Vehicle band brake.....A. Sperl
Vehicle body.....J. D. Artz
Vehicle brake.....W. W. S. Kime
Vehicle running gear.....E. J. Pennington
Vehicle sand box.....G. M. Porterfield
Vehicle steering gear, Motor.....E. Mathieu
Vehicle, Compressed air supply for electric.....R. L. Owen et al
Veterinary surgeon's float.....R. J. Fleming
Wafer and preparing same, Adhesive.....A. P. Anderson
Wagon jack.....D. D. Getman
Wall and floor brace.....J. A. Ettler
Wall, Building.....2 pats.....F. E. Kidder
Wall or ceiling sheet metal lining.....H. A. Ball et al
Washboiler.....G. Hacker
Waste trap.....C. Barber et al
Water closet.....H. C. Waldmann
Water gage glasses, Adjustable guard for.....G. W. Ames
Water service supply tank.....P. J. Leithausen
Weather strip.....W. Peace
Weighing machine.....C. J. Simeon et al
Well boring apparatus.....J. C. Adkins
Wheel.....J. S. Stevens
Whip, Drop top.....H. M. Van Deusen
Windmill.....H. S. Simpson
Window casing, Shop.....J. W. Crofts
Window frames, Means for securing screen or storm sashes to.....C. Faust
Window ventilator.....D. Schafer
Wire, Manufacture of iron or steel.....F. Forsberg
Wire stretcher.....J. W. Potter
Wire stretcher.....N. L. Hawthorn
Wrench.....R. A. Hammond et al
Writing board, Hand.....2 pats.....C. J. Bellamy
Yoke and holdback, Neck.....C. Murray
Zither picking device.....W. R. Verstraelen et al
Zither, Self playing.....W. R. Verstraelen et al

DESIGNS.

Advertising calendar and postal card holder ..
.....O. Clark
Badge.....E. E. Bower
Mirrors or similar articles, Bank for hand ..
.....S. A. Keller
Rug.....3 pats.....J. A. Carroll
Spoons, forks, or similar articles.....Handle for
.....P. Farnham
Stove.....T. M. Barbee et al

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MECHANICAL PATENTS.

Adding machine.....S. H. Drysdale
Advertising display means.....J. W. May
Air brake coupling, Automatic.....F. M. Caron
Air brake mechanism for cars, Automatic.....W. H. Sauvage
Air brake mechanism for railway cars, Automatic.....W. H. Sauvage
Amusement apparatus.....C. V. Johnson
Artillery, Naval or military.....G. C. J. Topp
Atomizer.....I. O. Gurnee
Automatic regulator.....W. S. Moody
Axle box lubricating packing holder, Car.....J. S. Patten
Bagging machine.....D. L. Whittle

Baling press.....F. G. Davies
 Baling press.....J. Kemp
 Battery plate mold.....A. C. Wood et al
 Bed bottom.....N. R. Murphy
 Bedclothes clamp.....A. Grandjean
 Bell.....P. C. Arnold
 Belt guide, Automatic.....G. S. Thompson
 Belt or chain, Link.....C. M. Lewis
 Beltting.....T. Gingras
 Bicycle coaster brake and hub.....S. N. Raop
 Bicycle pedal toe clip.....C. F. Cooper
 Bill head or statement sheet and envelop.....W. H. Bassinger
 Binder and lock therefor.....H. E. Dade
 Binder, Loose leaf.....2 pats.....C. R. Nelson
 Binder, Temporary.....J. B. Barlow
 Block signal system.....F. B. Corey
 Bluing stick.....L. N. Ippenplatz
 Boiler furnace, Steam.....D. L. Shaffer
 Bolt anchor.....H. B. Newhall
 Book, Lodge account and receipt.....J. C. Scoggins
 Bookcase, Sectional.....J. Mauro
 Boring machine.....C. W. H. Blood
 Bottle.....J. Fitzpatrick
 Bottle, Non refillable.....W. V. K. Ayres
 Bottle, Non refillable.....P. McGrath
 Bottle or jar closure.....G. T. Reed
 Bottle stopper, Non refillable.....J. B. Ross
 Bottle washing apparatus.....M. Feuerstein
 Branding iron.....F. France
 Breathing apparatus.....C. W. Madsen
 Brick drying plant.....G. Pagel
 Brick mold.....E. W. Seamans
 Brick signal.....L. Allen
 Broiler.....F. F. Hendrickson
 Brooding and nursing apparatus, Stock.....G. Eisold
 Bucket, Bait.....R. H. Paar
 Buckle, Harness.....M. E. Zeller
 Building block molding press.....G. H. Denton
 Bunsen burner.....T. Smith
 Burning apparatus, Pulverulent fuel.....W. F. Wolfe
 Button blanks from shells, Machine for manufacturing.....C. Schroepfer
 Button, Cuff.....F. E. Farham
 Cabinet.....H. McCrory et al
 Cake or doughnut cutter.....G. W. Baier
 Calculating machine.....C. M. Furman Jr
 Calipers.....C. E. Lamb
 Camera.....L. Nesemann
 Cameras, Lens carriage clamp for photographic.....F. B. Case
 Can body machine feed mechanism.....E. Zeh
 Can closure.....F. Ginet
 Can or receptacle for articles of merchandise.....J. C. Kimsey
 Candy forming machine.....B. B. Bowers
 Canned substances, Processing.....H. C. Gardner
 Car chair.....G. W. Chambers
 Car construction.....H. F. Vogel
 Car coupling.....O. H. Grupe
 Car door opening and closing mechanism.....J. R. Carmer
 Car sign turning device, Electric.....J. M. Smith
 Car stake cap.....A. A. McIntosh
 Car stopper.....R. R. Williams
 Car, Street.....C. B. Price
 Car, Tank.....G. I. King
 Car, Tank.....A. Stucki
 Car unloading device.....J. P. Sheehan et al
 Carpet stretcher.....J. P. Gallagher
 Carpet stretcher.....F. Ferriero
 Cartons or folding boxes, Machine for making.....L. S. Burbank
 Carving machine.....G. A. Baghurst
 Casting apparatus, Bar or rod.....J. O. E. Trotz
 Cement kiln.....F. M. Haldeman
 Chain, Drive.....C. E. Whitney
 Cheese cutter.....G. W. Martin
 Cheese cutting machine.....M. Foran
 Cheese gage.....W. H. Frank
 Cheese, Manufacture of Roquefort.....J. A. Trillat
 Chuck, Drill.....C. R. Pascucillo
 Chute, Coal cart or wagon discharge.....J. Gibson
 Cigarettes, &c. Machine for rolling.....T. Moesinger
 Circuit breaker, Time limit.....E. M. Hewlett
 Circuit protecting device.....E. W. Rice, Jr
 Clothes drier.....T. M. Anderson
 Club or baton.....E. J. Trout
 Clutch for variable speed counter shafts.....I. M. Foster
 Coat and hat hook, Wire.....R. Washburn
 Cock, Stop and waste.....P. Healey
 Coin actuated mechanism.....M. N. Tomblin
 Coke oven.....T. Bauer
 Collar.....A. Johnson
 Collector ring and means for securing it into position.....H. F. T. Erben
 Color binding mediums, Production of.....C. H. Voigt
 Compass correcting device.....F. Morrison
 Composite structure.....H. A. Crane
 Composition of matter.....E. C. May
 Condenser.....O. S. Still
 Conveyor.....H. H. Bighouse
 Conveyor rollers.....F. N. Merrill
 Cooking implement.....S. Greenfeld
 Copy press.....M. J. Foyer
 Copying press.....M. J. Foyer
 Corn fork, Hot.....F. Peters
 Coupling.....J. Gaop
 Crushing or pulverizing mill.....E. C. Griffin
 Crutch.....W. A. Phillips
 Cultivator, Rolling disk.....H. B. Furr
 Cultivator tooth.....O. E. Johnston
 Converter.....3 pats.....A. Lauritzen
 Current machinery, Alternating.....A. S. McAllister
 Carrying machine, Automatic.....F. Loge
 Curtain bracket.....B. L. Forshee
 Curtain fixture.....C. A. Roth
 Curtain fixture.....W. H. Forsyth
 Curtain pole.....A. E. Hunter
 Curtain rod support.....J. E. Fanning
 Curtain stop.....R. E. Wagelev
 Damper regulator.....G. R. Smith
 Dental appliance.....F. C. Rood
 Dental instrument.....J. Mills
 Dental tool.....R. M. Chase
 Dentistry.....D. T. Hill
 Display rack.....C. L. Taylor
 Display stand.....E. Doize et al
 Dobby and jacquard device, Combined.....H. Reuffer
 Door, Grain.....G. L. Merrill
 Draft equalizer.....H. H. Oodahl, Jr
 Draft equalizer.....O. O. Fjeld

Drain inlet for surface water, Tile.....H. N. Neireiter
 Dredges, Lower tumbler and ladder end for elevator.....S. L. G. Knox et al
 Dumping mechanism.....T. Lawson
 Dumping receptacle.....W. McMahon
 Dust collector and separator.....E. Venderbush et al
 Dye and making same, Azo.....P. Julius et al
 Dynamo.....M. C. Burt
 Dynamo mounting for railway car trucks.....W. F. Richards
 Dynamo regulator.....G. S. Neeley
 Dynamo voltage regulator.....G. S. Neeley
 Ear.....E. L. Williams
 Edge tool.....J. E. Eaton
 Electric apparatus, Vapor.....M. von Recklinghausen
 Electric circuit cut out or fuse.....O. Feuerlein
 Electric lighting device.....O. Gergacevics
 Electric machines, Brush and brush holder for magneto.....E. B. Jacobson
 Electric meter.....3 pats.....T. Duncan
 Electric motor brake.....L. A. Tirrill
 Electric motor control system, Multiple.....W. Baxter, Jr
 Electric motors, Controlling.....C. W. Kennedy et al
 Electric switch.....J. C. Keller et al
 Electrical connector.....P. H. Fielding
 Electrical distribution system.....W. L. R. Emmet
 Electrical indicator.....W. J. Forrest, Jr
 Electrical switch.....H. W. Cox
 Electrode, Battery.....A. C. Wood et al
 Electrode waste in gas or vapor electric devices, Replenishing.....P. H. Thomas
 Electrolytic meter.....H. I. Wood
 Electromedical appliance.....S. H. Linn
 Electroplating machine.....J. Bailey
 Energy, Means for protection against reversal of.....L. Wilson
 Engine gas and air mixer, Gas.....M. F. Bates
 Eraser.....H. O. Keferstein
 Excavating apparatus.....T. F. Moore
 Explosive.....2 pats.....H. von Dahmen
 Eyeglass lock nut.....W. F. Todd
 Eyeglasses.....F. X. Gartland
 Eyesight test cabinet.....W. A. Rosenbaum
 Fan motor, Rotary.....J. W. Miller
 Fastener.....3 pats.....J. D. Strickler
 Feed water purifier and filter.....W. Dougherty
 Fence post device.....I. M. Warner
 Fertilizer distributor.....L. W. Hamilton
 Fertilizer distributor.....J. H. Howard
 File.....F. X. Boehler
 File.....C. B. Smith
 File, Corn or callous.....R. M. Johnson et al
 Fire alarm, Electric.....W. B. Hopkinson
 Fire escape.....C. Kramer
 Fireproof drop curtain.....J. H. Channon
 Fireproof shutter.....W. Beckmann et al
 Fish trap.....O. Melbye
 Floors, Plastic composition for covering.....H. Linnekogei
 Flue cutter.....J. W. Faessler
 Flue stopper and cap, Combined.....H. J. Saecker
 Fly paper, Receptacle for shipping and exposing.....T. D. Nostrand
 Flying machine.....G. W. Thompson
 Folding box or crate.....S. G. Williams
 Foot rest, Detachable.....A. O. Warren
 Friction device.....L. A. Shepard
 Fruit picker.....J. H. Widdicombe
 Furnace charging apparatus, Blast.....W. R. Reece
 Furnace flues, Apparatus for making deeply corrugated.....W. Sainforth
 Furnace.....T. G. Selleck
 Furnace for the combustion or destruction of refuse, Shaft.....H. Ochwat
 Furnace rabble Roasting.....M. Corcoran
 Furniture leg attachment.....W. H. Klein
 Furniture lock.....L. J. Kutz
 Fuse.....G. Wright
 Fuse, Projectile.....2 pats.....H. P. Merriam
 Fuses, &c. Safety locking device for projectile.....H. P. Merriam
 Garment supporter clasp.....G. E. Prentice
 Gas or vapor electric apparatus.....P. C. Hewitt
 Gas or vapor electric device.....P. H. Thomas
 Gas, Purifying.....W. O. Felt
 Gas purifying apparatus.....J. E. Pregardien
 Gate.....G. E. Barnhart
 Gate.....W. I. Cox
 Gate.....J. Flinner
 Gold saving apparatus.....J. S. Bollinger
 Golf club.....C. E. Clark
 Governor attachment.....I. Arrasmith
 Grader, Road.....W. Alcorn
 Grain conveyor.....E. M. Kramer
 Grain separator.....E. M. Kramer
 Grape berry stripping and crushing machine.....E. Bach
 Grate sifting attachment.....J. G. & J. B. Lamotte
 Gridework.....C. W. Smith
 Grinding machine.....D. H. Ruckle
 Grindstone truing machine, Rotary.....C. W. Howland
 Gun carriage wheel brake.....O. Lauber et al
 Hame fastener.....J. H. Wilson
 Hammock support tripod.....W. J. Noble
 Harness plume.....A. Rutherford
 Harvester and husker, Corn.....L. E. Harding
 Harvester, Pea.....H. J. Case
 Harvester, Traveling.....J. Trethewey
 Hat provided with receptacle.....J. Y. Werrick
 Haulage system.....H. S. Moore
 Hay fork, Horse.....A. J. Miller
 Hay rake.....M. R. Jenkins
 Headlight.....G. J. Smith
 Hoisting apparatus.....3 pats.....C. W. Hunt
 Hoisting apparatus.....R. L. Davis
 Hoisting apparatus automatic check and release mechanism.....C. de Mocombe
 Hoof trimmer, Lever.....J. A. Steinheimer et al
 Hook.....A. H. Cobb
 Hosiery, Seamless.....G. H. Gilbert
 Hot air register attachment.....W. A. & M. D. Kilmer et al
 Hunting knife, Folding.....M. H. Rowland
 Husking implement.....H. J. Tillia
 Hydrocarbon vapor burner.....H. B. Cary
 Hydrogen carbide, Producing.....H. S. Blackmore
 Incubator or heater.....G. R. Smith
 Index or the like, Card.....B. Brower
 Inhaler.....S. H. Linn
 Ink.....H. H. Spohu

Ink well.....G. M. Hudson
 Insulated electrical conductors, Flexible metallic tubing for armoring.....W. H. K. Bowley
 Interchangeable coupling.....A. Dorgans
 Irrigating ditch head gate.....W. J. Warren
 Jar closure.....C. Fricke
 Jar covers, Tool for repairing.....F. A. Rothgery
 Jar lock and protector.....S. S. Stocker
 Jar or bottle closure.....W. H. W. Jones
 Jars, bottles, &c. Locking device for the closures or stoppers, of.....F. Canfield
 Joist hanger.....W. D. Dreyer
 Juice extractor.....W. Bruen
 Kettle, Steam jacketed.....W. L. Culver
 Knife blade holder, Adjustable.....H. E. Britton
 Knob attachment.....N. W. Crandall
 Knotted gearing.....J. M. Rector et al
 Lamp bulb, Incandescent.....F. M. F. Cazin
 Lamp, Electric arc.....F. Sindingchristensen
 Lamp, Electric arc.....F. Fleming
 Lamp, Gas or vapor electric.....P. C. Hewitt
 Lamp, Hydrocarbon incandescent.....G. Washington
 Lamps, Manufacture of electric incandescent.....F. M. F. Cazin
 Lantern, Dark room.....W. S. Davenport
 Last.....H. O. Davis
 Lead gage and arbor level.....M. C. Barry
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 Lightning arrester.....W. H. & J. E. Geist
 Liquid cooling apparatus.....A. Siebert
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 Lock and latch keeper plate.....B. Phelps
 Locomotive steam feed strainer.....F. S. Stevens
 Loom for tufted or pile fabrics.....C. Vorveck
 Loom harness motion.....C. F. Roper
 Loom head motion.....R. Crompton
 Loom motion, Jumper or half and return.....W. A. Hilton
 Loom selvage motion.....C. F. Roper
 Loom shedding mechanism.....R. Crompton
 Loom shuttle.....M. O. Steere et al
 Loom shuttle, Self threading.....J. Northrop
 Loom weft replenishing mechanism.....C. Hamig
 Mailing machine.....E. S. Reed
 Maroons, Preserving.....G. B. Raffetto

Mandrel holding and operating machine.....W. N. Jones
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 Mirror frame.....L. B. Prahar
 Mold.....A. Schoellhorn et al
 Molding.....F. E. Maine
 Molding machine.....J. Reid, Jr
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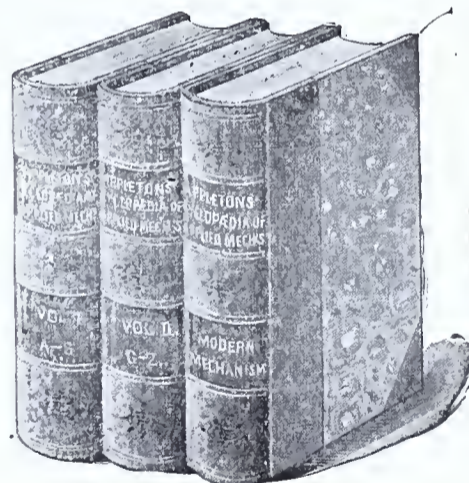
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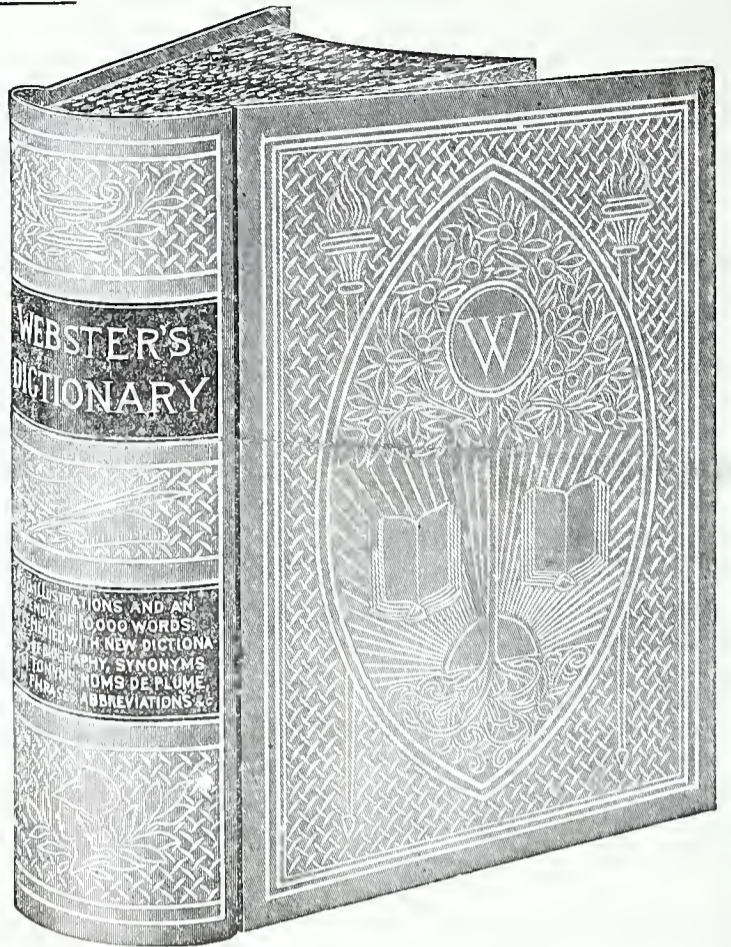
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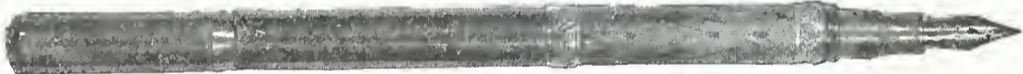
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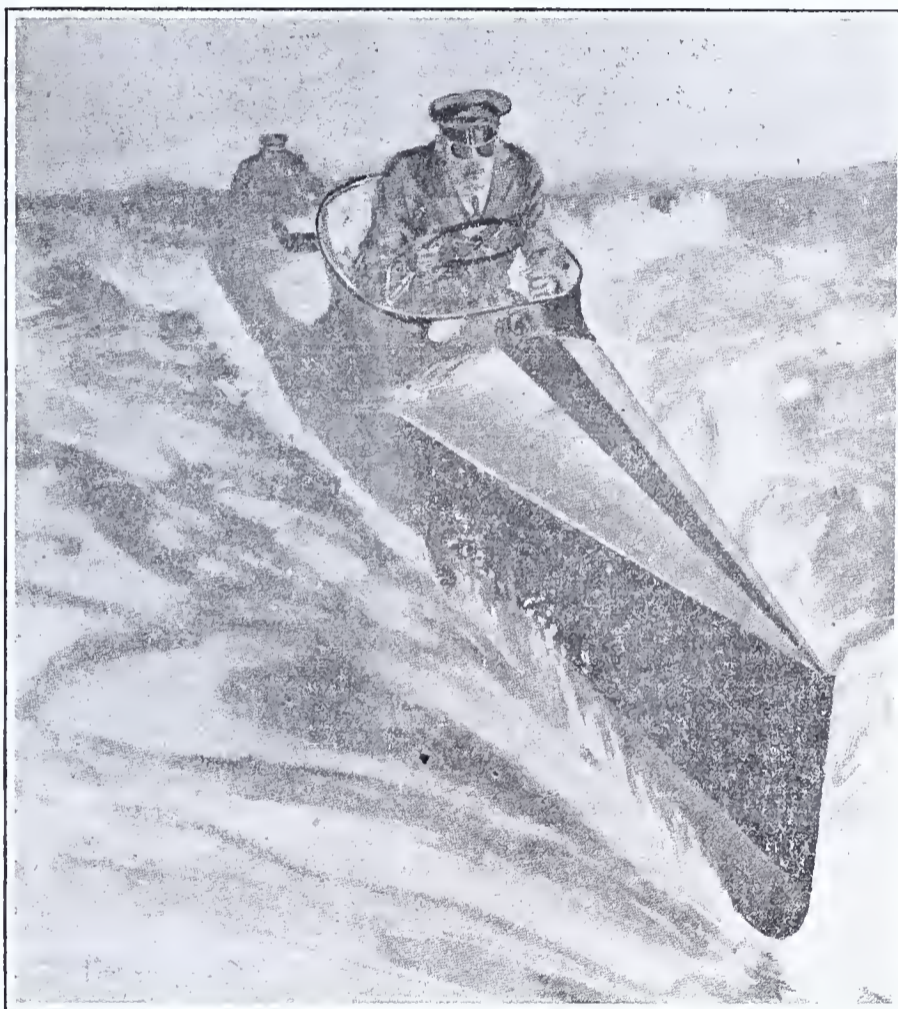
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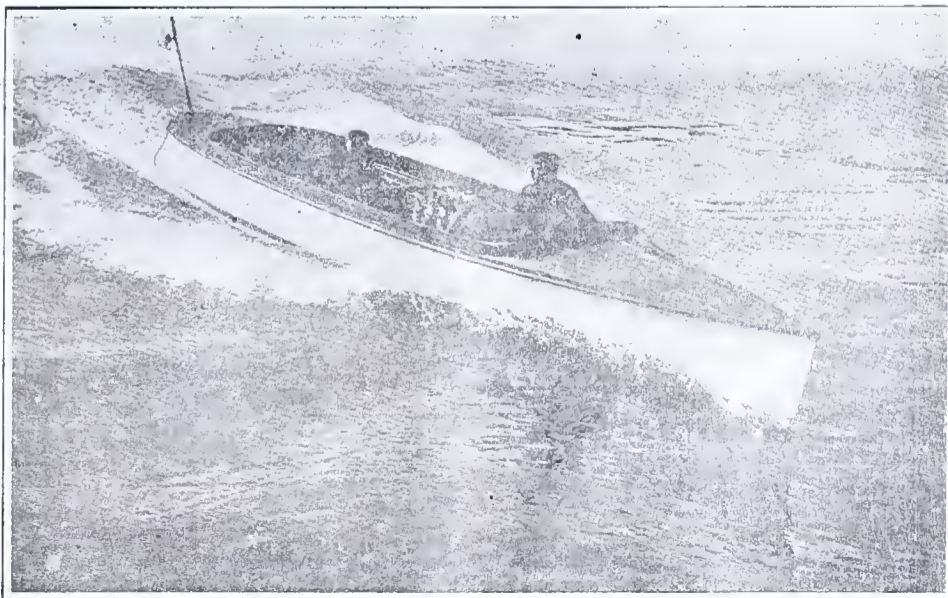
WATER AUTOMOBILES.

THE sensational project of crossing the ocean in motor boats is about to be carried out. Prizes aggregating \$40,000 have been offered for the first boat that makes a successful voyage, and an "Atlantic Cup" Club has been organized in Paris, with one of the Rothschilds as President. Mr. Lewis Nixon, of shipbuilding fame, is now constructing a motor boat, and proposes to start it across the ocean early in December. A number of enthusiasts on the other side, preferring to wait until the weather is more propitious, are going to race across, under fixed rules, next spring. The regulations for this unique contest are as follows: No boat is to be allowed to enter which has not already developed a speed of 17 miles an hour; each boat must carry at least six men, and must make the whole trip without replenishing its fuel; there are no restrictions as to dimensions of boats or force of motors, but the motor must be capable of being started in ten seconds. This last provision is to exclude the little steam yachts that are not, properly speaking, considered to be motor boats. Steam automobile vessels, however, may be admitted, as well as boats using alcohol, petroleum, or any other convenient fuel.

This contest is the natural outcome of the development which the racing boats have made in Europe. At races in Lucerne, Switzerland, during the past summer, a number of boats covered a distance of 70 miles at an average speed of 25 miles an hour, and arrived at the finish almost simultaneously. Contests on the Mediterranean are now being planned. The question of fuel will be the most important thing in the Atlantic trial. It is believed that the boat must be at least 100 feet long, so as to provide the proper accommodation for the crew and for the quantity of fuel to be transported. To generate enough force to push this weight at the speed required would require upwards of 1,200 gallons of gasoline, say, per day. It is a serious question whether it is safe to carry such masses of inflammable essence. The cost, too, of such



THIRTY MILES AN HOUR—A HIGH-POWER MOTOR BOAT AT TOP SPEED.



A POPULAR TYPE OF MOTOR BOAT.

consumption, will foot up over \$4000 in the expenses of the trip. Of course, if the boat were allowed to take supplies en route, or if it were not necessary to maintain such speeds, the cost would be much lessened. But the whole object of the contest is to show the possibilities of the high speed boat.

The winner of the cup at Lucerne expects to make the ocean trip next May, with a boat upwards of 100 feet long, having a motor of 100 horsepower which will be propelled by heavy petroleum, with a specially designed carbureter. It is thought the trip can be made in 10 or 12 days. The route will be marked out in advance, probably within well known lines, so that all transatlantic steamers can be on the lookout for the racers. A number of ocean yachts will also be stationed at intervals along the course, to watch for them, and to assist in case of accident.

Mr. Nixon's experiment promises to be more adventurous, as he will start from New York alone. His boat, it is said, will have a speed of 22 knots. His experience may decide more than one question which is now a matter of theory.

As to the practical value of the performance, one point is that the transatlantic liners could carry a number of such small boats on board, to use instead of lifeboats in case of emergency. They would have many advantages over the ordinary lifeboat, among others, that of being able to proceed at high speed toward the coast or to seek aid.

Whatever may be the outcome of the race, the growing popularity of the motor boat marks another step in the superseding of steam as power. Electricity, of course, has been a potent factor in the change, but automobiles both on land and water have shown the practical utility of oil and gas engines. The United States Navy has been making experiments with oil fuel, and finds it entirely available under certain conditions. The fact that steam is absolutely dependent upon coal, and that it is necessary for the navy to maintain coal depots all over the world for the use of its

vessels, shows the inconvenience of this form of power. This was instanced by an occurrence during the present war. A small Russian fleet was sent to the East at the outbreak of hostilities with Japan; but when it reached the Red Sea, it was obliged to put back, because it had run out of coal, and no neutral port would provide more than enough to enable it to reach the nearest Russian harbor. The scope of a modern battle ship, in short, depends on her coal supply, and this must necessarily be restricted to distances relatively curtailed.

Another disadvantage in the use of steam is the enormous loss encountered in its generation. Incalculable quantities of power pass up the chimney, or disappear in ashes, in leaks or in radiation. The great advance made in the use of internal-combustion engines in automobiles shows the possibility of using these engines for other purposes. The most important method of generating power in an internal combustion engine is through the use of producer gas—which has been likened to burning coal in a stove and having an engine run by the gases sent off through the smoke pipe. The entire gas plant does not take up more room than the boiler necessary to produce steam in an ordinary engine, which construction is the greatest drawback in ship-building.

There must be provided under present conditions air and space for stokers to shovel in fire-rooms large enough to ensure them against prostration from heat, and large coal bunkers. All this would be done away with by the use of gas or gasoline engines. Again, it is estimated that 15,000 pounds of gasoline will do the same work as 96,000 pounds of coal. The cost of the fuel is higher, but fewer men are needed to work it, the danger of steam at high pressure is done away, and the complexity of machinery obviated. A 10,000 ton cruiser of 21 knots an hour could, if supplied with this form of motor, proceed around the world at 14 knots without losing any of her efficiency in time of battle.

Since peat, turf, wood, sawdust, tanbark, coke, lignite, coal or petroleum can be used to produce gas, the range of utilization of this new power is enormous. The operation of gas plants is very simple. Instances are on record where they have run night and day for three months without stopping or needing repairs.

Quick Bread Making Process.

A London newspaper describes an invention which entirely dispenses with the customary night work in bread making. The preparation of the dough takes most of the time required in the ordinary baking process, as, after mixing and kneading, it must be left to rise, which requires from four to twelve hours. The new invention reduces this time to about one hour. No additional plant is required and no extra ingredient is put into the bread. "The effect is produced by the action of temperatures," explains the descriptive article. The inventor has patented the process, and a company to exploit it, called the Quick Bread Company, has been formed. At a practical demonstration recently given it is said that the flour was made up into dough ready for the oven in fifty-nine minutes, and the batch of twenty-five loaves was produced from the raw flour in two hours and thirty-five minutes. The flour was weighed, and the number of loaves compared with the number produced by the ordinary process, and it was found that eight more quarter loaves than usual are produced from a sack of flour.

NEW METHODS OF ELECTRIC LOCOMOTION.

THE superseding of steam by electricity is evidenced in the recent decisions of important railways of the East and North to use trolley lines as feeders to their main systems, and to employ electric locomotives in certain localities. The New York Central will equip the West Shore Railroad, which it owns and which parallels the Central between New York and Buffalo, with monster electric engines, and make it the backbone of a huge trolley system, which will be employed as a feeder to the main line. The company will gradually acquire electric properties along the line designated until it controls practically all the transportation facilities in that section. Those who have been

the engines that now pass at every minute obscuring signals and rendering this one of the danger spots in the system. The new motors, an illustration of which is here given, will develop 2800 horse-power each, or one thousand more horse-power than the steam engines that now haul the Empire State Express and the Twentieth Century Limited, when running at a speed of 60 miles an hour.

The electric motors will weigh 85 tons apiece, and can run at the rate of 75 miles an hour. They will be 37 feet long, and can move in either direction with equal facility.

It is also announced that the New Haven road will spend millions of dollars in electrical installations for

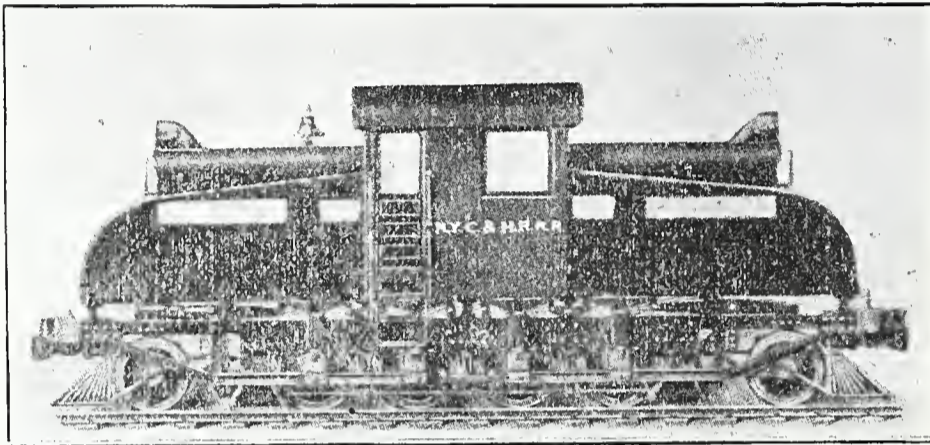


FIG. 1.—ELECTRIC LOCOMOTIVE FOR MANHATTAN TUNNEL.

looking forward to the passing of the steam engine, regard this action on the part of the New York Central as signalling the first step toward the abandonment of this form of locomotion. The trolley systems have in the past furnished a formidable competition to the railway through thickly settled communities, and the railway companies have been obliged to interest themselves in this method of transportation. It is now claimed that every obstacle to the displacement of steam by electricity in the operation of railway trains has been removed, and that the change will be made as rapidly as possible.

its suburban service near New York. It is believed that the near future will see electricity used as a motive power for all work except the long distance express service; and this may also be changed, in time, to follow in the line of progress. Immense capital has been invested in locomotive plants and car shops, and these will have to be rearranged to construct the electric engines and new rolling stock necessitated by the altered conditions. But it is claimed that the expense of the change will be more than covered, within a few years, by the saving in fuel and motive power.

England has recently furnished us



FIG. 2.—NOVEL MOTOR TRAIN.

Another important step has been the elimination of steam locomotives from the New York terminal of this road, and the substitution of powerful electric motors, which will take charge of trains some thirty miles from the city and convey them through the Manhattan tunnel, thus greatly adding to the comfort of travellers as well as to their safety: the smoke and steam from

some interesting facts as to the relative economy of using steam engines or electric motors as feeders on short lines of a trunk railway. On the Taff Vale Railroad, the type of train employed consisted of a coach with the motor compartment placed at the front end. The cost per train mile, by motor car, including operation, repairs, etc., amounted to a fraction

under 11 cents, while with the use of a locomotive and four ordinary British carriages, it footed up 30 cents, making the first method 60 per cent cheaper. It is intended, in the installations on the New Haven road, to have each car on an electric train equipped with a motor, so that the combined strength of all the motors make the total hauling strength of the train. In this line, it must be confessed, we are behind France, which has been using automobile trains, or automobiles as they call them there, for some time. They consist of a number of individually propelled motor cars, and have the advantage of dispensing with the enormous weight of the locomotive and the consequent wear and tear of the road. The managers of the French railroads (Paris, Lyons and Mediterranean) which have adopted this system declare themselves satisfied with the results. They point out that apart from the benefits already mentioned, much greater speed can be attained than with the use of steam, and the trains do not have to stop in the course of a long run for fuel. The fastest steam train does not average more than 55 miles an hour for long distances, and this speed cannot be greatly surpassed without increasing the weight of the engine. On the other hand, automobiles have accomplished 80 miles an hour on the high road, and could, of course, exceed that speed on steel rails.

At the last automobile show in Paris, there was presented a novelty in the shape of a motor train that is independent of tracks. It consisted of a line of vehicles attached together, only one of which carried a motor, while the others derived power from this source, and so became practically self-propelling. This new device is meant for use on ordinary roads, and is in the direction of low-speed automobiling. It is intended primarily for the benefit of country districts which have not the advantages of steam or electric railways. The difficulty in the use of trains of motor vehicles has been the necessity of employing a heavy tractor, which damages the roadbed and is not easily manageable. These drawbacks are overcome in this train, as only one of the vehicles is provided with a motor, and this is a movable generator of power that can be placed at any part of the train. The power is distributed to all the vehicles, each of which is provided with an arrangement by means of which the portion of the energy furnished to it is employed for actuating the wheels, so that each vehicle is a motor wagon, and propels itself with as much facility as though it were alone. Accurate steering of the train is effected through a special arrangement, by means of which each vehicle follows the same curve as the preceding one. This permits the cars to make the proper turns without skidding, which usually occurs when one vehicle is drawn by another.

The method of transmitting power consists of a longitudinal shaft that extends from one end of the train to the other, traversing all the vehicles and the intervening spaces. This shaft is universally jointed so as to permit the train to make sharp turns, and is provided with arrangements by means of which the motion given by the motor at one point of the shaft is transmitted to the entire length of the train without any alteration. The sections of the shaft connecting those carried by the vehicles are removable, so as to permit the cars to be joined or separated at will.

The weight of the first machine, or

locomotive is no greater than that of an ordinary car, and the whole train can be operated by the driver of this machine without any more difficulty than is experienced in the operation of a common automobile.

At the Paris Show, the automobile train that was exhibited had as head car a motor wagon provided with a 50 horse-power gasoline motor, and an ordinary change-speed gear. It also had a special device called a variator, which consisted of a second change-speed gear which was set before the trip began, and the effect of which was to reduce, to a desired degree, the speed of the vehicles. The illustration (FIG. 2,) shows the train making a sharp curve.

The system, which was invented by Colonel Renard, who has already won distinction in solving problems with reference to dirigible balloons, has the advantage of eliminating vehicles of excessive weight, and of permitting the train to be as easily managed as a single automobile, its flexibility being such that the cars follow the leader with absolute cer-

wide, and in excellent condition; there are very few curves. The cars are provided with electromotors, and the power will reach them through rotary poles placed on their tops, and sliding blocks. The wiring will consist of two hard copper wires, with hard rubber insulators, carried by iron poles 18 feet above the middle of the road. For entering farmyards lying close to the road, there will be used, instead of the regular wire, a connector and flexible cable 50 to 70 feet in length, by means of which the current will be transmitted to the motor car. Ordinary electric cars have but one pole, and the second pole of these railless cars serves for conducting back the current—a service ordinarily performed by the rails.

When two trains pass each other, one will remain standing under the wires and disconnect its current until the other has passed.

The trains will consist of an electric locomotive, (see FIG. 3) adapted to draw two or three cars. The freight wagons have a capacity of about five tons. There is a special contrivance

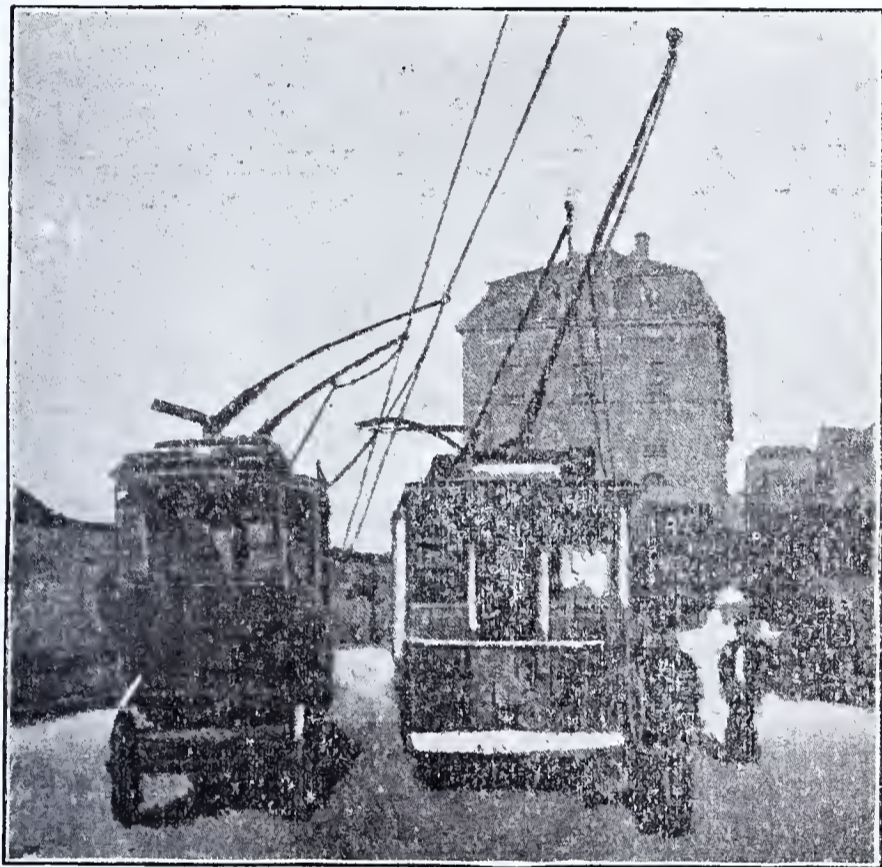


FIG. 3.—TRACKLESS RAILWAY.

tainy. As the first car, or locomotive, has no pulling to perform, but only needs to supply power to the other wagons, it can be built proportionately very light. In the experiments, the locomotive weighed only 3,300 pounds, and it moved a train of 20 tons weight over ordinary country roads at the rate of 16 miles an hour.

It is hoped that this new train will be found very useful for military as well as for industrial purposes, and for transportation of passengers and freight. Conveyance between localities devoid of railways could be established by this method, at the cost of rolling stock alone. The Renard principle, it should be noted, is applicable not only to trains such as have been described, but to mixed trains, composed of motor vehicles and a few ordinary ones, and to trains running upon rails. Or the motive power, instead of being obtained from the locomotive, may be obtained from any external source, and be transmitted by trolley or any other process.

If the last described system were adopted, it would closely resemble a method now employed in Germany, and called a "trackless railway." There are several of these in Saxony and Westphalia, and an experimental line has just been established in Prussia. It will serve for the transportation of persons, freight and mail. The roadway is about 23 feet

for coupling, so as to keep an exact rut of all the cars, which takes the place of wheel flanges in ordinary rail trains. Farmers' wagons can be attached to the end of the train, provided the ordinary tongues are replaced by shorter couplers. For the passenger service, an omnibus capable of carrying 24 persons is provided.

The buildings to be erected for the use of the railway are a power house and car barns. Inasmuch as this method of traction does away with the heavy initial expense of preparing a roadbed and laying tracks, it would seem that it must be remunerative. It is said, however, that the expense of operating is high, inasmuch as the electric energy required to move cars over dirt roads exceeds by 100 per cent the force necessary to draw cars over iron rails. In any case, it would require much improvement of our roads, before such a system could be introduced into the United States.

Another development in automobile service has been the establishment, by railway companies in England and Germany, of motor omnibuses as feeders to the regular railway service. These automobiles run in suburban districts, where the travel is light, and carry passengers, luggage and mails. They have served, it is announced, as perfectly adequate substitutes for fixed lines of costly railways.

AN INGENIOUS LIFEBOAT.

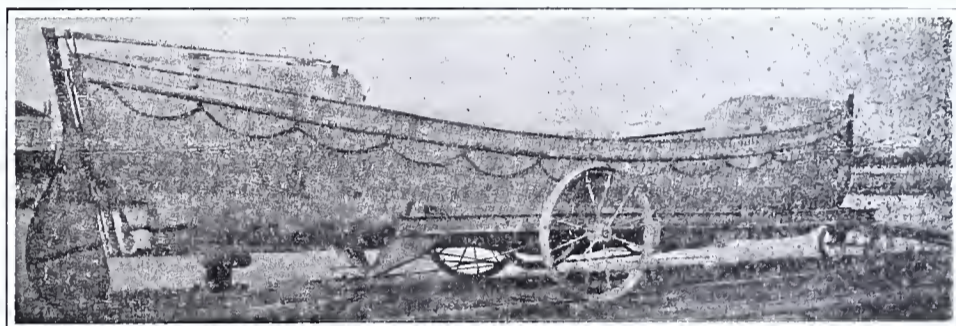
Since the date of the General Slocum disaster in New York, there has been a revived interest in methods and devices for safeguarding the lives of those who travel on the water. Efficient life belts, boats that can be readily launched and that are not liable to swamp in swift currents, and similar apparatus would have a tendency, by their mere presence, to lessen the panics that are always the most potent cause of the loss of life. Recent experiments with an automobile life boat at La Rochelle, France, therefore, have attracted considerable attention. The boat which has the extraordinary feature of a hole in the bottom, is still more remarkable in that water does not enter by this opening, and seas that are shipped over the sides find an outlet therethrough.

the stability of the craft. An orifice, that runs the whole length of the keel chamber, allows the immediate evacuation of any water shipped, and valves prevent the projection of water from below into the chamber.

The boat is fitted with oars and sails, but has also a double cylinder 12 horse-power gasoline engine, which gives a speed of 6 knots an hour. The engine cannot be reversed, but by an ingenious contrivance, the propeller blades can be reversed instead, which produces the same result.

The claims for the new life boat are that it is unsinkable and cannot be upset. The following experiments were made to demonstrate its seaworthiness.

The boat was raised stern first until it assumed a line vertical to, and 6 feet above, the surface of the water. It was then released, and plunging bow first into the sea, righted itself



The frame of the boat (see illustration) consists of two galvanized iron or steel concave shells, the smaller superimposed in such a manner that the concavities are uppermost, and leave a large air space between them. This air space is divided into twelve lateral water tight compartments. In the very center of the boat is a longitudinal opening, intended partly to empty the boat and partly to hold a centerboard consisting of thin sheet steel, provided with a 600 pound bulb of molded lead. This serves as a weighted keel, and insures

immediately.

It was turned upside down on perfectly smooth water, and being slightly raised on one side, as by a wave, at once rolled over on an even keel.

An artificial wave consisting of four tons of water was then suddenly thrown into the boat from a height of about 12 feet. The boat emptied itself almost instantly.

The consensus of newspaper opinion of these experiments is that a decided advance has been made in the development of machines intended to save human life from the sea.

NEW DOGS OF WAR.

Considerable interest has been aroused, especially in military circles, by the fact that an order has been received by a well known trainer of ambulance dogs in England, for a number of these animals to proceed as soon as possible to Manchuria. Ambulance dogs are now used in nearly all continental armies. For the last eight years, the Englishman referred to, who holds the rank of major, has devoted himself to the teaching of these dogs, and has experimented with every suitable breed with excellent results. The dogs are trained to search for the missing and wounded in rocky and difficult ground, or in thick cover. They carry stimulant in a barrel at their necks, bandages in small saddles on their backs, and remain by the wounded man until the stretcher bearers arrive.

The ability of the St. Bernard dogs in rescuing travelers overcome by the snow has been famous for generations; but with the extension of modern methods of conveyance, they have become creatures of the legend rather than of necessity. Travelers are in such a hurry nowadays that they cut through the Alps by tunnels, or mount them in automobiles; and few indeed

are the wayfarers who traverse the pass on foot, especially when the weather is such as to demand assist-



AMBULANCE DOG BEING EQUIPPED FOR THE FIELD.

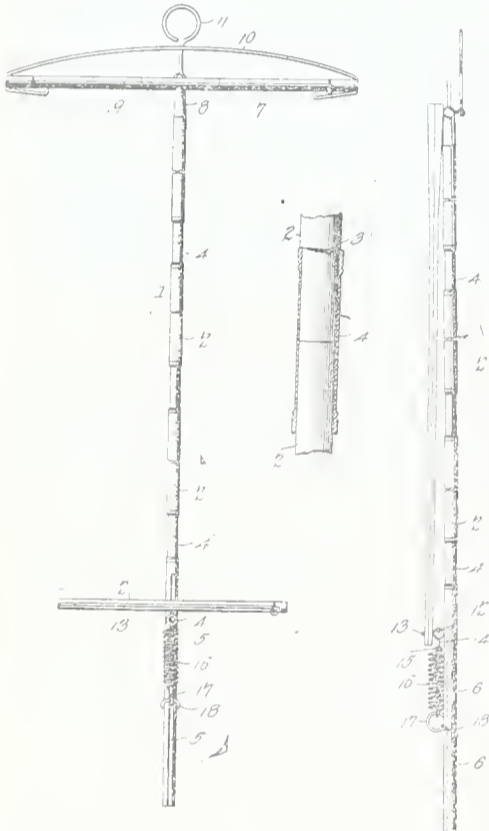
ance from the dwellers in the hospice. But the canine life-saving instincts are capable of being adapted to modern conditions, and the new dogs of war will probably find a much wider field of usefulness than their precursors of the St. Bernard.

CLEVER NEW PATENTS.

Trouser-Stretcher.—Wire Clamp.—Mill for
Crushing Ores.—Reversing Gear.—
Candle Attachment.

Trouser-Stretcher.

Sanford Gasser, of Sherman, Mich., has invented and patented a trouser-stretcher, which he claims will stretch trousers properly and hold the same in shape. Certainly the means he employs is simple, and is believed to be worthy of careful consideration. A rod or bar is employed having a series of notches formed therein at one end and having a transverse clamping member at its other end. Another transverse member is slidably associated with the bar at the end having the notches, and to the same is connected a coiled spring. A ring, attached to the free end of the coiled spring, surrounds the rod or bar and is adapted to engage in the notches thereof.



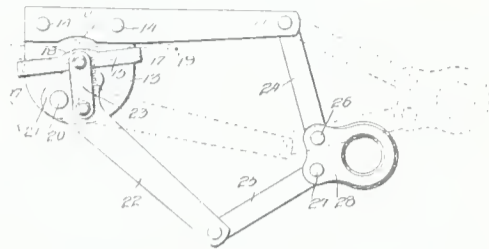
In operation, a pair of trousers are first clamped at their upper ends to the fixed clamping member by engaging the clamping-rod over them. Their lower ends are then similarly fixed in the movable clamping member, which latter is adjusted to suit the length of the trousers and exert the proper stretching tension thereon by moving the ring 18 along the lower section of the brace member, and engaging the same with one of the series of notches formed thereon.

If it is desired to pack the device for transportation or storage, it may be readily disassembled by slipping the ring 18 from off the lower section, disjoining the various sections, and removing the fixed member from the upper section.

Wire Clamp.

A wire clamp of novel construction has been devised by Mr. John E. Dusang, of Larue, Ohio. The invention relates more particularly to devices employed for the purposes of clamping and stretching wire, as, for instance, in stringing telegraph and telephone wires, fence-wires, and the like. The invention consists in certain

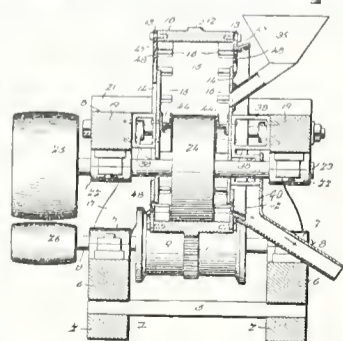
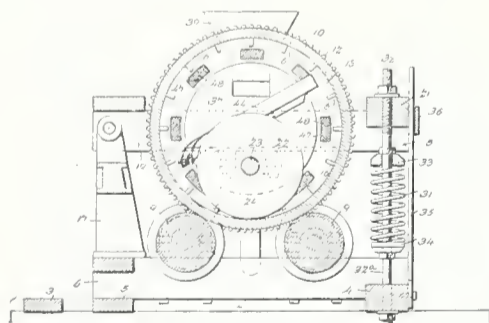
novel features of construction, whereby a simply constructed but easily operated and applied device is produced, which may be conveniently attached to, and disconnected from, the wire without injuring or weakening the same.



A stationary jaw member is employed having a guide plate extending therefrom. A movable jaw member, co-acting with the stationary jaw member, has extended ends that are folded around and loosely clasped on opposite sides of the guide plate. A cam lever is pivotally connected with the guide plate for operating the movable jaw member. A link pivotally connects the member with the cam lever, and means are provided for operating the latter. The movability of the jaw member 15 is an important feature of the invention, and materially increases the efficiency of the device, inasmuch as the jaw member 15 will thereby automatically adjust itself to the wire and clamp it with certainty and precision and hold it with a uniform grip, so that no unequal strains are imparted to the wire to weaken it; but, on the contrary, distributing the strains uniformly along the whole length of that portion of the wire which for the time being comes between the jaw members.

Mill for Crushing Ores.

An important improvement in mills for crushing ores has been patented by Mr. Andrew B. Mouck, of Fargo, N. D. The object of this invention is to so construct mills of this character that they will be light, cheap, and yet efficient in operation, and adapted to crush ores and other material rapidly and effectually, and furthermore operating either in conjunction with or without water. The invention relates to that type of mill wherein a



revolving roller operates within a revolving drum, a crushing action being effected between the periphery of the roller and the opposing inner surface of the drum. The roller is mounted on a shaft that is journaled in fixed bearings on the supporting

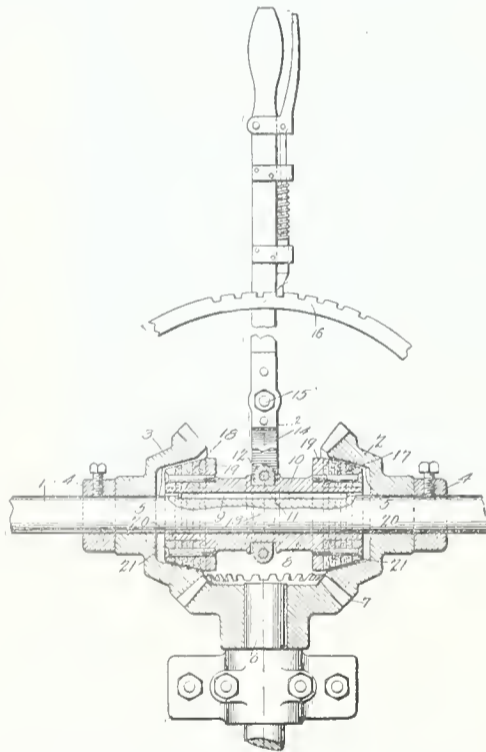
frame. A spring-pressed swinging support carries spaced rollers, on which is mounted a drum that surrounds the crushing roller. The drum is provided with an annular runway in its inner side concentric with its axis of rotation, and pockets, located on the sides of the runway, open directly thereinto and are also open on their inner sides. Plates are secured to, and form the heads of the drums, these plates having central openings closed by relatively fixed plates.

In the treatment of free milling gold ores, a suitable quantity of quick-silver is placed in the drum and the amalgam is discharged through the flush-hole.

The mill is further provided with discharge-openings 47, which are made in one of the plates 13 and are covered by screens 48, the meshes of which are of such size as may be required. By the use of these screens, the size of the particles of material discharged from the mill through the hopper 39 is determined, as will be understood, and is of uniform fineness.

Reversing Gear.

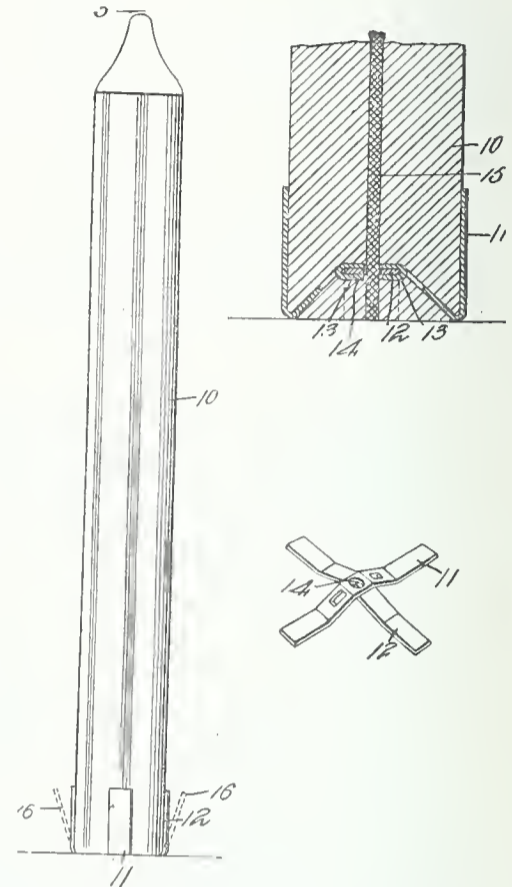
One of the simplest reversing gears yet produced is illustrated in the accompanying cut, and is the invention of Mr. Edward L. Shore, of Eldon, Ia. The driving shaft 1 is located at right angles to the driven shaft 6, the latter having rigidly secured thereto a pinion 7, meshing with pinions 2 and 3, loosely journaled on the driving shaft.



The pinions 2 and 3 are recessed, and thus form female clutch members that receive the heads 17 and 18 of a male clutch member slidably mounted on the driving shaft, between the pinions 2 and 3. The male clutch member has associated therewith a controlling lever 14, and by swinging this lever in opposite directions, one or the other of the heads is thus brought into engagement with one or the other of the loosely journaled pinions. The result is that these pinions will be revolved, and thus the driven shaft can be positively rotated in either direction. It will be seen from this construction that the inventor has provided a reversing mechanism in which the direction of rotation of the driven shaft may be instantly changed, and this by means of mechanism mounted upon a drive-shaft which stands at right angles thereto. It will also be seen that he has constructed an improved clutch member admirably adapted for the purposes explained.

Candle Attachment.

While candles for general purposes of illumination have been largely supplanted by other illuminants, still they are used when other means, from any cause, fail or are not available. In such cases, it is invariably a difficult matter to find means for supporting the candle and maintaining it in an upright position, and, while different ex-



pedients are well known, none have ever proven satisfactory. Mr. Martin L. Bush, of Lawrence, Mass., has devised what may be termed an "improved candle" by attaching thereto means which may be employed to support the candle, or, if the candle is to be used in a candle stick, this means can be placed entirely out of the way. The candle itself may be of the ordinary form and structure, but it has embedded in its lower end cross strips of metal which may be readily bent, the terminals of these strips projecting beyond the candle. In their normal position, the projecting portions are bent upwardly alongside the outer face of the candle and thus will not interfere with the same being placed in a candle stick. In the absence of such a device, however, the user has only to bend the strips outwardly, whereupon an extended base is formed at the bottom of the candle that will constitute a support for the same.

One of the very important functions of the improved device is to support the wick end in a vertical position, after the candle material has been melted away from it and consumed, thus preventing the wick end from falling over and setting fire to the support upon which it rests, as frequently occurs when candle ends are left to burn out. By this simple expedient, if the candle is carelessly left to burn out, the burning wick end will be supported above the material on which the candle rests and prevented from coming in contact with it while burning, and all danger of fire from this source is thus obviated. This feature of the invention adds very materially to the value of the device.

BUILDING RAILROADS BY MACHINERY.

SUCH strides have been made in railroad engineering, and so complete is the machinery now used for track building and laying, that it has happened that a locomotive has whistled for the first time in many a Western town which, the day before, was not in hearing distance. Nearly all of our railroad building is now being done in the West, as the East is fairly gridironed with rails, and the needs of commerce are pretty well supplied. Therefore, many people are unaware of the remarkable progress that has been made in expediting this work. Railroads are now being built at the rate of two or three miles a day: it has happened that half a mile of rails, weighing 75 pounds to the yard, have been put down in an hour. The roadbed on which the track rests is made up by the steam and horse grader, great holes are filled up to the track level automatically, and the ballast to hold the ties and rails in place is distributed in the same manner. In certain sections of the Rockies are "fills" which were once chasms 200 feet deep, and every cubic foot of the material was deposited in the abysses without being touched by the shovel or pick of the workman. Such has been the development of mechanical aids that the engineers of these Western triumphs declare that with the use of modern machinery, two dozen men could span the continent with a band of steel.

It is an education in human activity to watch the work of these twentieth century path-finders. The roadbed men usually begin the task. Scrapers, drawn by mules, turn up the surface, their sharp steel edges planing off the ground to the proper grade. A trough or chute is attached to the scraping blade at such an angle that the loose dirt is forced upward through the trough and poured from it into a wagon driven by the side of the scraper. As soon as one wagon is filled; it is replaced by another. Without a pause in the operation, the scraper continues steadily ahead, the wagon train it loads maintaining the same speed. At the end of the day, a single scraper will have leveled off a mile of roadbed, so three or four of them will open up the way for a long distance ahead of the track makers. But if the lines run over a hill or valley, the steam shovel is called into play. Its ponderous steel teeth tear through the rock as well as the earth, taking out, with each hit, as much as two horses can haul. Beside the shovel stands a train of cars made of steel plates. The upper portion of the car is shaped like the ordinary coal-carrying vehicle, but from the middle of the body it contracts until the plates form a sharp angle where they meet at the bottom. These plates move on hinges connected with a steel rod that extends the length of the car. After the cars are loaded, they are hauled to the valley to be filled in. A workman goes to the end of the train and pulls a lever. The lower plates

of each car swing out on their hinges, and the whole train load of earth and gravel falls beneath the track. When the cars are empty, another pull of the lever throws the plates back into their original position. If ten men had been put on each car to shovel it out, they would have needed at least half an hour to accomplish what is done in a minute by one man operating the lever.

When the roadbed has been sufficiently surfaced, the rail layers begin operations. Their apparatus is so simple that the amount of work done seems incredible. Apparently, everything goes on wheels, except the few men adjusting the ties and those who are fastening the rails to them. A train of a dozen flat cars is pushed forward by a locomotive. From the front car extend two wooden timbers which overhang the roadbed for a distance of about twenty feet. These timbers are held rigidly in place by a wire rope attached to the outer end of each and stretched back over the archway on the car, forming a miniature suspension bridge. Getting aboard the train, you see it supports a little elevated railroad, the rails being fastened along the top of each car and extending back to the piles of ties and rails stacked up on the rear of the train. Besides this railway, the train contains a series of rollers set in the centre of the elevated track, but below the tops of the rails, which constitute what might be called a "rollway." There are, in fact, three transportation systems within these narrow limits—the one on the ground, the railway for carrying ties, and the rollway for moving rails. How they work can best be explained by watching their operations. At the rear end, a car of ties is being loaded. What the men call a "tie loader" is pushed against the pile of wooden slabs. The end next to the pile slants downward, so that it forms an inclined plane to the top of the loader. Two men pull out half a dozen ties at one motion upon the plane, up which they are quickly shoved. The upper part of the loader consists of a platform attached to legs by metal latches, the legs resting outside of the rails. Along comes a little car, just low enough to run under the loader platform. As it does so, it unhooks the latches fastening the legs, and the loader drops upon the car, which automatically receives it, ties and all, and takes it to the front end of the train, and out upon the suspension bridge. It is prevented from falling over the edge by blocks bolted to each of the beams; but when its front wheels strike the blocks, only the car itself stops. The platform containing the load of ties rests upon rollers, and it continues in motion, and is tilted over to such an angle by the weight of the ties that they slide from it to the roadbed. The rear part of the platform, however, is caught on an iron clamp projecting from the top of its conveying car, which prevents it from following the ties. These fall across the roadbed at a right angle to the rails, and enough are dumped at a time to support 60 feet of track.

While the tie car is making its trip, the "bolters" have fastened four rails

into pairs, connecting each pair by bolts run through the fish-plates clamped against their ends. They are then placed on the rollway and started for their destination. When they reach the end of the suspension bridge, they are run onto another roller set in a wooden frame that holds it about two feet from the roadbed. This contrivance allows the rails to be carried nearly their length ahead of the end of the bridge, and serves to let them down easily on the ties which have already been arranged for them. As soon as they touch the ties, the men do not wait to drive in the front spikes, but fasten what is termed a "bridle rod" to the front ends, while the rear ends are being bolted to the track already in place. This rod holds the rails so firmly that the train is at once pushed ahead over the newly-laid track, which is completely spiked to the ties while the material for the next section is being hauled over the elevated ways. Thus, the train can be moved forward 60 feet at a time.

Looking back along the line, you see another train approaching, loaded with gravel or crushed stone. The cars are the same shape as those which were filled with the big steam shovel. As the train moves slowly along, the stone is allowed to fall between the rails and the ties. The cars continue in motion until all are empty, when the engineer reverses his lever and starts back after another load. The ballast has been deposited, by this device, so evenly that it is not only level with the tops of the ties, but extends a foot or so outside of each rail. Only a little work here and there by the shovel gang puts the finishing touches to the track, so that the express train can rush over it at a mile a minute, without the danger of a rail spreading or a tie moving.

A few statistics may help to make clear the rapidity of the work done. To put down 60 feet of track means, of course, to set in position 120 feet of rails. The average rail is 30 feet long, so that four rails are required to cover the 60 feet. Such a track-laying machine as described has laid 1180 rails in ten hours. This means the laying of nearly one-third of a mile every hour,—the ties placed at their beds, and the rails not only laid upon them but fastened to the wood and made ready for service. When one man can throw a thousand tons of ballast at once on the roadbed, it will be seen that this part of the work takes but little time, and where a railway is to be built in a hurry, the ballasters follow so closely behind the track-layers that they are apt to be in sight of the construction outfit much of the time.

The amount of manual labor saved

is the most remarkable of all. First come the scrapers, doing all the work of the hand shovel, yet two men only are needed for each machine.—one to guide the horses, the other to adjust the blade and chute. With the steam shovel are an engineer and his assistant, for the shovel fills and empties its scoop into the cars without the touch of a hand. Compressed air unloads the cars, but the dirt train usually has half a dozen men aboard for emergencies, besides the engineer and fireman. On the track-laying train, two men load all the ties on the tie car, and one man moves it to and fro. For bolting the rails and handling them on the rollway, six men are enough. About twice as many arrange the ties on the roadbed and fasten the rails. Add the locomotive crew, and the above comprises the total working force, except the men who put the few finishing touches to the track after the ballast train has passed over it. With this labor, and with the apparatus described, railroads spring into existence like mushrooms.

Washing the Blood.

The search for a physical process which would act directly on the blood in cases of poisoning is not a new thing, two methods up to the present having been tried—transfusion and washing of the blood. Transfusion has given proof of its worth, but the difficulties are such that the application of the method is necessarily restricted. A Paris scientist has just constructed an apparatus for washing the blood, with which he has experimented on animals. The chief difficulty with this method of cleansing has been that the simple dilution of the blood does not render the renal filter permeable to the poisonous substances. The new method is to extract a large quantity of blood from the organism and to mix it with eight-times its volume of a saline solution. This mixture is sent into a centrifugal separator which is combined in such a way that all the blood globules are united almost instantly at a single point, where they are passed into a pump which injects them into the animal. The working of the apparatus is automatic and continuous, the result being to extract the plasma with all the matter dissolved therein, and to replace it with artificial serum; and this without injuring the blood globules, for which a short passage outside of the organism is not injurious.

PATENTS

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MECHANICAL INVENTIONS AND DESIGNS

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James P. Montgomery, inventor; O. Martinson, assignee, Wichita, Kan. Animal Poke.—The device of this patent consists of a small disk, having a projecting edge, and provided with a pin for enabling it to be attached to the neck of a cow or other animal. Should the animal attempt to thrust its head between or under the wires of a fence, the wire immediately above its head will follow the neck closely until it strikes the device. The projecting edge of the disk will guide the wire beneath the device, and the forward movement of the animal will be effectually checked. The device will enable cattle to be enclosed by fences having fewer wires than heretofore.

Charles E. Lamb, Galena, Kansas. Caliper.—The aim of the present invention is to provide an exceedingly sensitive instrument, adapted to indicate on a scale the slightest variation in the size or diameter of an object from a standard or predetermined size. It consists of a caliper having a truncated leg, and an indicating device having a movable member forming a continuation of the truncated leg, and cooperating with the other leg. The improvements are adapted to be applied to the ordinary caliper, and do not necessitate any material change in the construction thereof.

Alexander B. B. Harris, Memphis, Tenn. Automatic Cistern Cut-Off and Self-Cleaning Filter.—This invention is an improvement on a former patent described in the AGE of November 1900, and provides novel means, which prevent the first of the rain water that contains the dirt and trash of the roof from passing into the cistern, but discharges the water into the cistern after the roof is thoroughly washed. The device is also arranged to prevent an undue waste of water in case of closely succeeding showers.

Jeff D. McCabe and Walter Hancock, inventor, Woodbury, Tenn.; James Thomas, and T. M. Bryan, assignees, same place. Combined Shaft Support and Rein Holder.—This is an improvement on a former patent described in the AGE of April 1902. It is the aim of the present invention to provide a device of great strength, durability and efficiency, adapted to be readily applied to vehicles for supporting shafts in an elevated position when the vehicle is not in use, and for clamping the lines when the driver temporarily leaves the vehicle. The device is readily adjustable to fit dashboards of different heights.

Joel F. Needles, Dayton, Ohio. Device for Handling and Measuring Lard, etc.—This inventor has made an ingenious device for handling and measuring lard, butter, ice cream, etc., and enables such goods to be quickly and accurately measured without soiling the hands or clothing. It is capable of readily severing its contents from the rest of the mass, and of expelling the measured material, which is automatically served from the device, so that the entire contents of the latter will be delivered into a dish or other receptacle.

Louis Paul, Wichita, Kan. Wagon Body and Hay Rack Lifter.—The object of this invention is to provide a simple and comparatively inexpensive lifting device of great strength and durability, adapted to be easily operated by one person, and capable of enabling him to readily remove a wagon box or hay frame from a running gear, and to replace it when desired.

Lawrence M. Rehnquist, Chicago, Ill. Hot Water Heater.—The heater of the present invention is designed for heating a large number of apartments, and is adapted for the use of any kind of fuel. It enables the hot water coil to be arranged within the fire pot without causing the latter to become clogged with ashes, cinders, and the like. Also the arrangement is such that it is necessary to renew the water supply only at considerable intervals.

Solon E. Moore, Putnam, Conn. Weather Strip.—On June 26, 1900, Mr. Moore secured a patent on a weather strip that proved a great success and was referred to in the AGE of January 1901. The present invention is in the nature of an improvement on the original structure. A felt buffer strip is employed that is doubled upon itself and has a compressible filling of cords enclosed therein. A binder strip encloses but one edge of the buffer strip, and one edge of the binder strip is located between the edges of the huffer strip, the whole being then secured by a line of stitching passing through the several overlapped margins. A lining sheet of paper or other suitable material is preferably arranged within the buffer strip, and assists in the prevention of the passage of air through the felt.

James S. Alexander, Jacksonville, Florida. Weighing Scoop.—The subject matter involved is a scoop having mechanism that will indicate the weight of the material placed therein, thus doing away with the necessity of placing such material into the ordinary scales. The handle of the scoop is provided with a guideway, in which operates a vertically movable frame, to which frame is secured the scoop bowl, and a spring scale, also carried by the handle, has a connection with the frame. Thus, when the scoop is forced into the material, there is no strain upon the weighing mechanism, but as soon as the device is lifted the weight of the material in the bowl will cause the same to move downwardly, thereby moving the scale and indicating the weight of the material.

John H. Major, Alden, Okla. Ter. Wire Working Tool.—This tool is made up of a plurality of parts, which may be conveniently assembled for anchoring it to a post to stretch a wire. Some of the parts are capable of independent use, and are adapted for mending the broken strands of a fence wire. It will enable the ends of a broken wire to be quickly stretched and readily spliced.

William M. Woodworth, Greentown, Ind. Crate.—This invention covers an ingenious device, which may be either used as a shipping crate, a tent, or as a cover for protecting trees and plants. It also may be advantageously employed for covering hay stacks, corn and fodder in the field, and in fact, anything of this nature which may require protection from the rain, snow, wind, etc. Smaller sizes are designed for use on counters, tables, etc., and for protecting edible articles from flies, dust, etc.

William E. Messacar, Albion, Mich. Combined Awning and Window Shade.—This invention has for its object to provide an improved awning and window shade adapted to be conveniently applied to, and removed from, a window frame. It is provided with means for elevating the awning and window shade simultaneously by the manipulation of a single controlling device.

William Whitlock, Greeley, Colo., inventor; Calvin W. Ravie, assignee, same place. Wagon Bed Attachment. This invention provides improved means for firmly clamping a wagon

bed upon the bolsters, and for permitting the ready removal of the former. The device is adapted to be applied to any ordinary form of wagon bed, and it is extensible to engage and fasten the side boards of the same.

Julian R. Harrison, inventor, Barnwell, S. C.; John M. Easterling, assignee, same place. Two patents. Bolt Holding Implement, and Detaching Device for Bottle Closures.—The first patent covers an ingenious device for engaging the head of a tire or other bolt to prevent the same from turning while taking off or putting on the nut. It is adapted to be applied to surfaces of different contours, and it is adjustable to articles of different sizes. It is capable of firmly holding bolts of various dimensions and diversely shaped heads.

The device of the second patent is a unique attachment for pocket knives, and it consists of a pivoted hook foldable within the handle like any ordinary knife blade, and capable of readily removing the crown seal from a bottle.

John W. Kunkel, Lazearville, and Clarence Robinson, Wellsburg, W. Va. Two patents. Jar Closure.—Both of these patents cover important and advantageous improvements in jar closures, and render a jar absolutely air-tight when sealed. The first patent provides a cover, which forms a flush continuation of the body of the jar, so as to avoid projections, and thereby permit a plurality of jars to be closely packed. The cap or cover of the second patent is adapted to be constructed of pressed glass, and is capable of being securely interlocked with the jar without the aid of additional fastening devices. Through a simple arrangement of interlocking lugs and flanges, screw threads are dispensed with.

John W. Peifer, Sullivan, Ill. inventor; James H. Thomas and William S. Skiff, assignees, same place. Broom Corn Harvester.—The object of the present invention is to provide a machine for harvesting broom corn standing in the field, and to deliver the product of the machine, i. e., the hrush or heads of the corn in bundles upon the ground at one side of the machine. The heads are cut in equal lengths, and the grain is removed without injuring the brush. The machine severs the corn stalks adjacent to the ground after the brush has been cut, and it leaves only the stubble standing in the field.

Frederick M. Matson, inventor; Mineral Point, Wis., George Kelly, assignee, Hinsdale, Ill. Holder.—This is a pen and pencil holder that can be placed in an ordinary pocket in order to distend the same, so that the walls of said pocket at the mouth will clamp the articles and hold them against falling out. There are a number of ways in which the invention may be embodied, the preferred forms employing a bowed spring that is placed directly in the pocket, so as to distend the same, and having at its free end hook portions that engage over the outer wall, the outer ends of these hook portions having inwardly extending arms that bear against the upper margin of the outer pocket wall and force the same inwardly, thus clamping it upon all articles placed in the pocket.

William A. Kester, Rock Island, Ill., inventor; William A. Diercks, assignee, same place. Clothes Drier.—The invention consists of an upright standard upon which is slidably mounted a carrier in the form of a turn table. To the carrier are connected cables that pass over crown

pulleys, mounted on the top of the post, said cables extending down the post or standard to a winding drum. The turn table has ball bearings and supports pivotal arms to which are connected the clothes lines that extend around the standard. Novel means are employed for locking the arms in upright position, so that they will be out of the way. A drier as thus constructed is particularly useful for yards or places where the space is contracted.

Michael O'Connor, Missouri Valley, Iowa. Fire Box Door Hole Flange.—In the construction of steam boilers, and more particularly those employed in locomotives, difficulty has been experienced in preventing cracking and leaking about the door of the fire box. The space is so contracted that very little water can come into contact with the metal; moreover, in this small space incrustations and deposits of foreign matter soon collect, thus keeping the water entirely from contact with the metal. This objection is overcome in a very simple manner in the present case by providing a fire-box wall comprising inner and outer sheets, the outer sheet having an inwardly extending flange, while the inner sheet has an outwardly extending flange that overlaps and is secured to the flange of the outer sheet. The portion of the metal forming the connection between the inner sheet and the flanges is inwardly swelled, thus not only forming an enlarged water chamber, but also a curved wall that will readily expand and contract without causing any dangerous strains.

John E. Lenholt, inventor; Cromwell, Conn., A. N. Pierson, assignee, same place. Nut lock.—This is a very simple device which will effectively fasten a nut to a bolt and also to the surface against which the nut is clamped, so that it is doubly secured against accidental turning. The nut is provided with the usual threaded opening for the reception of the bolt and has an annular seat formed in its inner face, the seat being concentric with and spaced from the opening, so that a compressible flange is formed therebetween. A locking washer is fitted in the seat, and consists of a split ring having its ends located out of alignment and being formed of a twisted angular bar thicker than the distance between the walls of the seat. Thus, when the nut is threaded down, the washer will force the compressible flange into engagement with the bolt. The edges of said washer, being comparatively sharp, will bite into the walls of the seat and the surface against which the washer rests, thereby serving as additional holding means for the nut.

George E. Moffett, Jarilla, New Mexico. Brake.—The object secured in the present invention is mechanism by which great braking power may be applied to the wheels of a car, thus making it of the greatest utility in cases of emergency. The mechanism can, moreover, be readily applied to a car without changing the system which may be in use. The usual brake lever is connected by means of an extensible draft rod with the lower end of a rocker arm, suspended beneath the car. Toggle links, one of which is connected to the rocker, the other being pivoted to the under side of the car, are also located beneath the car, and one of said toggle links is extended and has an upstanding foot piece, projecting through the platform on the car in convenient relation to the foot of the motorman. With this construction, a slight pressure of the foot upon the foot piece effects a movement of the toggle links, so as to throw the brake into action with great force.



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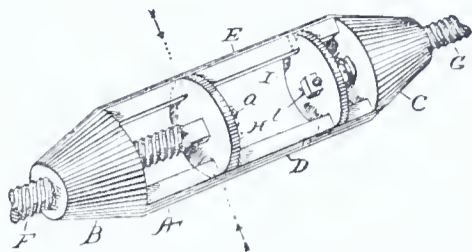
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WASHINGTON, NOVEMBER, 1904.

THE NEW ENGLISH PATENT LAW.

A Comparison With the United States Law and Some Suggestions as to the Latter.

In the issue of March, 1903, the AGE commented on certain prospective changes in the law governing the practice of the English Patent Office. It was expected that the law would be enacted sooner, but it seems that it will not take effect until January 1, 1905, after which time the expense of procuring English patents will be considerably increased: first, on account of the increased government charge; and second, owing to the extra work entailed in the prosecution of applications before the English Patent Office. Because of this fact, parties who are contemplating protecting their inventions in England should apply for patents in that country at once, or at least, file applications for provisional protection in England prior to January 1, 1905, as it will mean a difference of from five to fifteen dollars in the cost.

It has already been explained that the plan of the amendments to the English patent law is to engraft thereon a system of examination somewhat similar to that prevailing in the Patent Offices of the United States, Germany, Austria, Norway, Sweden and Canada. At present, the Comptroller of Patents of the English Patent Office, who corresponds in official position to the Commissioner of Patents of the United States Patent Office, simply records each application presented and issues patents thereon, except when opposition is made by outside parties and it is shown to the satisfaction of the Comptroller of Patents that patents should not issue on the opposed applications. It may not be generally known that the secrecy which surrounds applications when filed in the United States Patent Office, does not prevail in the English Patent Office. Indeed, after an application has been accepted as formal by

the Comptroller of Patents of England, it is immediately thrown open for public inspection, and anyone, during the period of two months thereafter, may oppose the grant of a patent: but as opposition proceedings necessarily entail some expense on the part of the one entering the protest, very few applications for patents have been opposed.

According to the present plan, the English Patent Office proposes to make an investigation in each application for a patent, for the purpose of ascertaining whether or not the invention claimed therein has been wholly or in part claimed or described in a specification of an English patent (other than a provisional specification not followed by a complete specification), published within the United Kingdom before the date of the application. If, as a result of the official search, it appears that the invention sought to be patented, has been wholly or in part claimed or described in any such specification, the applicant will be informed and given an opportunity to amend his specification, so as to confine it to so much of his supposed invention as he may desire to patent in view of the specification to which his attention has been called by the Comptroller of Patents. Should, however, the applicant refuse to withdraw his application, or fail to amend the specification to the Comptroller's satisfaction, the latter may order that a printed reference be made in the said specification to any prior patent, with which, in the opinion of the Comptroller, the invention may conflict, in order to give notice or warning to the public. The patent will then issue. Of course, opportunity is given in every case to take an appeal from the Comptroller's decision, but it is not intended in any case that an application should be rejected.

The differences between this course of procedure and that practiced by the United States Patent Office, are as follows:

First, in the United States Patent Office, the examination is not confined to United States patents fifty years old, but comprehends every United States patent which has been granted, all foreign patents, and printed publications in every language. In order that such an extensive examination may be conducted with a reasonable degree of rapidity, both United States and foreign patents are classified, and the printed publications are, in many instances, digested.

It is clear that under the new practice which will obtain in the English Patent Office after January 1, 1905, an applicant for a patent could make an application and secure a patent on an invention patented fifty-one years ago in England: and since printed publications, other than patents, are not taken into account, many things which are not patented but are simply referred to in scientific publications, might be made the subject-matter of numerous applications for English patents. Just why the English Patent Office limited the field of search to fifty years, and to English patents alone, is not plain. It appears to us

that if an examination of fifty years is of any consequence, that the scheme of examination should be carried to its logical conclusion and be made to cover English as well as foreign patents, no matter how ancient, and in addition, printed publications in every language. Perhaps the English law makers were staggered at the prospect of inaugurating so comprehensive a work all at once. If, therefore, the new plan of a fifty-year examination, is simply the precursor of a more extensive examination in the future, than the step taken, may be regarded as a distinct advance.

Second, in the United States Patent Office, if any of the claims of an application are rejected by the primary examiner thereof who has the application in charge, and the applicant can not prevail on that official to allow the claim either in an amended form, or by argument in its original form, the claim will stand rejected, and will not become a part of the patent, unless some appellate tribunal of the Patent Office reverses the action of the examiner. By the new plan proposed in England, the claim which the Comptroller thinks is bad because of its being anticipated by some prior patent, may still be incorporated in the patent, provided the applicant makes reference in the specification of his patent, to the English patent referred to by the Comptroller of Patents. By this arrangement, the English Patent Office in effect refers the matter to the courts to decide if the invention of the patentee is patentable thereover.

There is much in this which is worthy of serious consideration. We do not think the scheme of the examination adopted by the English Patent Office is sufficiently exhaustive to be of any material benefit to an applicant for a patent. In fact, we cannot see the necessity for any limitation in the number of years over which the examination should extend. We are entirely in sympathy with what has become to be known as the "American plan" of examination, which includes United States patents, all foreign patents, and printed publications in every language; but we have sometimes thought that the practice of the United States Patent Office in deciding on the patentability of inventions, is objectionable, and that it tends to shut out many meritorious improvements.

Every practitioner has had the experience of having an application rejected by an examiner of the Patent Office, not because it is anticipated by a prior patent, but simply for the reason that the examiner does not regard that the application for patent claims an invention which is patentable over some other prior patent or printed publication.

The reason for this practice on the part of the United States Patent Office is because Section 4886 of the Revised Statutes says that any person "who has *invented* or discovered any new and useful art, machine, manufacture, or composition of matter—may—obtain a patent therefor." Therefore, it is not every new and useful art, machine, manufacture, or composition of matter, which is patentable; it must contain or show evidence that it

amounted to "invention" to produce or create the same.

If the Statute read thus: "Any person who has made or discovered any new and useful art, machine, manufacture or composition of matter," may obtain a patent therefor, then the Patent Office would be justified in granting a patent on every art, machine, manufacture, or composition of matter which was "new and useful." In other words, every new and useful art, machine, manufacture, or composition of matter is not a patentable invention under the law. But who is to decide whether the particular art, machine, manufacture, or composition of matter described in an application for patent is a new and useful invention? The Commissioner of Patents, as the head of the Patent Office, is supposed to render such decision, and if he could pass on every application for a patent, and determine, in each instance, that the application did show a new and useful invention, it would be comparatively simple; but owing to the great number of applications for patents, the Commissioner of Patents is compelled to delegate this work to the examining corps consisting of thirty-eight primary examiners, with from four to eight assistance each. As each primary examiner presides over a division, it follows that there are thirty-eight divisions in the Patent Office today. Each primary examiner is supreme in his own division; the Rules of Practice constitute his limitations. The question of patentability of the applications assigned to his division is decided by the primary examiner, and his decision is final unless appealed from.

Three appeals are allowed, one to the Board of Examiners-in-Chief, the second to the Commissioner of Patents, and the third appeal to the Court of Appeals of the District of Columbia. It is a well-known fact that some of the examiners are liberal, while others are very illiberal. It seems to be the case that the longer an examiner stays in a certain division, the more illiberal he becomes. Now, although the Statute permits an applicant to appeal, it follows that even with the successive appeals allowed, numerous inventions have been adjudged to be not patentable which the applicants and their attorneys thought were patentable. Furthermore, many applicants are not in a position, financially, to appeal from the adverse decisions of the primary examiners. Again there are always a certain class of cases which might be called marginal or doubtful cases, and which the examiner may reject or allow, as he sees fit. If rejected, the applicants hesitate to risk an appeal.

The great objection that is made to the present practice of the United States Patent Office is that an attorney cannot determine with any degree of accuracy, when presenting an application for a patent, whether the Patent Office is going to allow the application or not. He has to keep in mind the division to which the application will likely be assigned, and with knowledge of the past liberality or illiberality of the examiner, determine the question of patentability from his

experience in the prosecution of application before that division. Instead of having in mind certain decisions of the Patent Office or the courts to guide him, he simply has to be guided by his own judgment, and his experience before the Patent Office in the prosecution of similar applications for patents. It has been proposed by certain practitioners before the Patent Office, that the Patent Office should simply confine itself in each case towards ascertaining whether or not the invention set forth in an application is a new and useful art, machine, manufacture, or composition of matter; and that every safeguard should be thrown about the examination, and the latter made as exhaustive as possible; but after it has been determined that the art, machine, manufacture, or composition of matter is "new and useful," then a patent should be issued. That is to say, the examiners of the Patent Office should not concern themselves about whether a particular claim sets forth a patentable invention, but should leave the question of invention to the courts, where it can be determined with more exact knowledge of the matter than by the examiners.

There is no doubt that this proposition has much to commend it. Many meritorious inventions have been shut out from the world by the illiberal practice of the Patent Office in certain divisions. The Patent Office is not in a position to make the same investigation which can be pursued by a court. When an infringement case comes up, the attorneys for both parties usually make a most exhaustive examination to determine the patentability of the claim embraced in the patent sued upon. Indeed, the examination in such cases is considerably more extensive and thorough than that made by the examiners of the Patent Office. Now, a court having knowledge of the infringement, and a complete understanding of the state of the art, and the value of the invention, can determine with a reasonable degree of accuracy, whether or not the invention comprehended by the patent was a patentable one. It is certain that a court would make less mistakes than the Patent Office.

Briefly, the plan would be to grant a United States patent to every applicant where an examination showed that the invention presented in the application was a new and useful one, leaving the question as to whether or not invention was involved in creating the art, machine, manufacture, or composition of matter to be determined by the courts, when the patent is sued upon for infringement.

It will be suggested that such a plan would throw upon the market a large number of worthless patents having claims which would be declared invalid by the courts, but a fitting reply to this is that the patents issued today are frequently declared invalid, and no amount of care on the part of the Patent Office is going to stop this. Whereas, it is a well known fact, that under the present practice, many applications for patents containing meritorious inventions are rejected by the Patent Office examiners, when they should be allowed, thus doing a great injustice to the applicant and hindering the advance in many arts.

We shall be glad to hear from our readers on this subject, as we should like to see how the proposition appeals to them.

Electricity in Fogs.

Fogs represent the greatest source of danger for those who brave the perils of the deep, and modern science is preparing to lessen their terrors. To the great traveling public, especially to those who manage the ferry boats in our crowded harbors, an account of an invention for dispelling the threatening mists by means of electricity, will prove of interest. It is to Sir Oliver Lodge, an English electrician of world-wide fame, that the world owes this last discovery. It was demonstrated years ago, by the great physicist Tyndall, that a heated body, if brought into a lighted atmosphere laden with dust, dispels the dust in its nearest environment and forms a dark space around itself. Tyndall thought that the hot body burned the dust, in his experiment with coal dust. Professor Lodge has found that this is incorrect: a sort of bombardment emanates from the heated body, which keeps the dust at a certain distance.

Lodge made the still more important discovery that if he employed electricity in place of heat, the dust particles acquired a polarity for forming into balls, and were thrown against the walls of the vessel in which the experiments were made. In his experiments, he did not use coal dust or smoke, but powdered magnesia. For the heated or afterwards electrified body, he used a wire, in the following manner.

Two pieces of wire netting which were connected with the ends of an electrifying machine were put up opposite each other in a room through which a slow current of smoke passed. After the wire nets had been electrified, the current of the smoke ceased. The particles of dust, balled together, were driven to the wall of the room and fell to the floor. When steam was introduced instead of smoke, it was converted into fine rain. This latter result led Professor Lodge to several conclusions. First, it almost showed by itself how rain was formed from the clouds through electrization, a fact for which, although it has been surmised, every proof was lacking. Further, Lodge concluded it would be possible to dispel a fog cloud by electricity.

He made his first experiment in this line in Liverpool. During a thick fog, the air was electrified by means of a large Winhurst machine, the current passing through a bunch of points on top of a high mast erected on the roof of the building. In this manner it was spread as much as possible. The result was that for a radius of from 165 to 200 feet, the air was perfectly clear and free from fog.

The professor then planned a trial on a large scale by placing a number of stations on both sides of the Mersey and charging the air on one side with positive, and on the other side with negative electricity, in order to see whether the fog on the river—which frequently caused collisions and heavy damages—could not be dispelled. Although the practical benefit of the scheme was apparent, however, funds were not forthcoming, and the experiment had to be abandoned.

The professor feared, moreover, that he could not obtain a sufficiently strong current, as a dynamo does not furnish the required high voltage. This problem was solved by the recently invented mercury lamp (described in the INVENTIVE AGE some months ago) which permits of the conversion of an alternating current of high voltage into a continued current. Experiments to this end have been conducted, and in order to demonstrate the latest results, Professor Lodge recently made some trials before the Physical Society in London.

The fog was produced by burning magnesium, the smoke being confined in a large glass reservoir. An electric current was introduced into the cloud, when the latter was immediately precipitated and fell down like snow, leaving the air perfectly clear.

Professor Lodge declares that there is no reason why the vapor particles of a cloud cannot be forced in the same manner to contract and to fall in the form of rain. To be able thus to produce rain at will would be of incalculable benefit in countries that suffer from droughts—such as British India. For a metropolis like London, the advantage would be two fold—on the one hand, to get rid of the coal smoke, and on the other to dispel the fog. Pittsburg should welcome such an innovation, and for ships at sea, as well as for the ferry boats that make their way in crowded harbors in the obscurity of fogs, the discovery will be of great value. The only drawback, as yet, lies in the cost of the experiments. The realization of the professor's expectations would hardly be more improbable than the practical use of wireless telegraphy, and it would perhaps not even require as large machines for the purpose, as fogs usually occur in calm weather, and rarely reach high altitudes.

Carbolic Acid Antidote:

A remarkable discovery has apparently been made by a veterinary surgeon of Ireland, respecting an antidote for carbolic acid poisoning.

His attention was drawn, some time ago, to two horses which were evidently suffering from poisoning, the symptoms being those produced by carbolic acid. The mucous surface of the mouth was blanched, and the animals were staggering. The muscles twitched, the eyes were staring, and the horses were rapidly assuming a comatose condition. The surgeon asked for some oil, linseed by preference, if not, any kind that was handy. Some was brought, about a glass full given to one of the animals, with a result that seemed almost miraculous. The surgeon then noticed that the "oil" which had been administered was the ordinary turpentine of commerce. A dose was given to the other horse, although by that time the animal was unconscious: it recovered in about ten minutes, and both were able to work the next day.

Shortly afterwards, the surgeon was asked to look at a blacksmith who had accidentally drank some carbolic acid. The man was in a state of coma, and the surgeon gave him some turpentine, which happened to be on the premises. The man not only quickly recovered, but was able to resume his work within a few hours.

Turpentine as an antidote in similar cases had been previously unknown, but the treatment was so successful that further experiments in the same direction are to be made. If trial confirms this treatment, every bottle containing carbolic acid should bear a label explaining that turpentine is the antidote.

Artificial Cotton.

Besides artificial silk, artificial indigo, and countless other substitutes for the handwork of nature, artificial cotton has been created. This is made from the cellulose of the fir tree, freed from bark and knots. The fibres, after being pulverized by a special machine, are placed in a horizontal, brass, lead-lined cylinder and steamed for ten hours, after which a wash of bisulphate of soda is added and the whole heated for thirty-six hours under a pressure of 3 atmospheres. Then the fiber, which has become very white, is washed and ground by a series of strong metallic meshes, after which it is again washed and given an electro-chemical bleaching by means of chloride of lime. Passage between two powerful rollers then dries the matter, producing a pure cellulose, which, when reheated in a tight metal boiler containing a mixture of chloride of zinc and hydrochloric and nitric acids (to which is added a little castor oil, casein and gelatin to give resistance to the fiber,) yields a very consistent paste. Threads are then produced by passing this paste through a kind of drawplate. These threads, after being passed over a gummed cloth, are immersed in a weak solution of carbonate of soda and passed between two slowly turning cylinders. Finally, to give the necessary solidity, the thread is treated to an ammoniacal bath and rinsed in cold water, after which the product is pliable and works well.

In Bavaria, experiments have recently been made to produce cotton from pine wood, and it is claimed that the trials have been very successful.

Radiant, a New Fuel.

Our Consul-General at London, England, reports that a new fuel called radiant, to be used in connection with gas and other fires, has been invented by two young engineers of that country, and if it be proved that it can do all that is claimed for it, it will cause as great a revolution in the present system of gas heating as did the introduction of the Welsbach mantle in gas lighting.

Radiant will take the place of the asbestos or fire-clay balls, and will, it is said, give out an intense heat. It is made from materials that are now waste products of chemical works.

The new fuel captures the blue flame, which at present is lost, and converts it into intense heat. Radiant is also said to possess the power of retaining heat to a very great extent.

The inventors claim for radiant—

1. That it gives treble the heat with the same gas consumption as an ordinary gas fire.
2. That it takes up the carbonic oxide from the air and purifies the atmosphere.
3. That it does away with the unpleasant smell given off by gas fires.
4. That it burns brightly like a coal fire.
5. That it is as cheap as fire clay and is inexhaustible.

The two young inventors are connected with one of the largest firms of gas engineers in England, and have been experimenting for years with a view to producing a fuel such as radiant.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE. This keeps inventors and manufacturers posted in the art in which they are most interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy; twenty copies \$1.50.—Please give correct data in ordering.—Address,

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Pumping or conveying device. Pneumatic..... W. J. Bell
Punch..... 2 pats. T. H. Lovejoy
Pyrographical instrument..... J. F. Burns
Rail covering. Third..... T. Buckley
Rail guard. Third..... J. H. Guest
Rail joint..... W. P. & S. G. Thomson
Rail joint. Suspended W. P. & S. G. Thomson
Railway. Electric..... A. F. Batchelder
Railway safety device..... P. A. Sawyer
Railway sanding device..... C. Allenbach
Railway signaling system..... F. Bongrand
Railway substructure..... S. E. Duff
Railway switch operating device. Street..... H. S. Hale
Railway switches and signals by means of a single lever. Apparatus for directly operating..... G. Bleynie et al
Railway tie..... D. C. Chipman et al
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Railway track wrench..... E. F. Miltenberger
Receptacle stopper..... E. C. Standing
Refrigerator..... A. Woodward
Register..... L. Ehrlich
Relay..... F. R. McBERT et al
Rice hulling machine..... F. G. Dieterich
Rolling mill. Tube..... J. H. Nicholson
Rolling tubing..... R. C. Stiefel et al
Rope fastener..... H. Gartelman et al
Rotary generator..... J. Delizy
Roundabout..... C. D. Daniels et al
Roundabout..... J. C. Scoggins
Sad iron heater..... M. E. Hadden
Sad iron. Self heating..... H. B. Swartz
Sash weight molding apparatus..... J. E. Price
Saw..... G. G. McGill
Saw guide. Swivel band..... A. Prana
Saw mill. Band..... W. M. Wilkin
Scale. Self measuring..... J. T. Jordan
Seed drill..... R. Commichan
Seed drill..... M. Mitchell
Seed separator. Cotton..... F. T. Pinter
Seeding machine feed..... L. E. Roby
Sewing machine bobbin winding attachment..... R. H. Legg
Sewing machine gage..... M. L. Holderman
Sewing machine shuttle actuating mechanism..... E. L. Bowers
Sewing or other machines. Means for operating..... N. Krawitzky
Shade trimming device..... J. A. Tufts
Shade. Window..... A. T. Smith et al
Shaft coupling..... A. A. Ball, Jr
Shaft lock. Rotating..... F. B. Case
Sharpening device. Knife..... T. Wilkins
Shearing machine..... W. G. Prichard
Sheep shears..... O. Bors
Ship steadying device..... T. C. Forbes
Ships. Magnetic curtain for covering leaks in..... L. Kruger
Shirt holder. Sample..... W. A. Clark, Jr
Shirt waist protector..... M. Aisbuler
Shoe heel antislipping attachment..... P. Carroll
Shoe. Low cut..... W. W. Palmer
Shut off..... J. G. Nehrbaas
Shuttle locking mechanism..... J. P. Johnson
Sickle bar..... S. Hagar
Sign. Street..... H. Hofheimer
Signaling apparatus. Wireless..... L. De Forest
Signaling receiver. Space..... L. De Forest
Siphon closet..... B. O. Tilden
Skirt fastener..... J. Demsky
Skirt supporter..... L. Wertheimer
Sleigh..... N. Johnson et al
Sliding gate..... J. Trisler
Smoke consumer..... R. O. Dobbin
Smoke house..... E. T. Malloy
Smoking pipe..... A. Parati
Snow melting apparatus..... H. C. Davis
Sock lining..... S. C. Whitmore
Socket member..... 2 pats. J. D. Strickler
Soda water apparatus, &c. Valve connection for..... J. Cederstrom
Sorting machine..... E. M. Lamb
Spinning frame thread guide..... G. Skinner et al

Sprocket wheel..... C. P. Wilhelmsen
Spur..... W. T. Hanaway
Square. Combined center or other G. M. Engel
Stanchion..... T. J. Wallace
Static machine plate..... H. E. & H. F. Waite
Steam boiler..... J. R. Lowrey
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Steam generator. Hydrocarbon..... B. Hall
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Stoker. Mechanical..... A. E. Woodmansee
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String cutter..... G. R. Butler
Strong box for valuables..... E. M. Wood
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Stump burner..... C. T. McCarroll
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Swing. Lawn..... A. S. Lowe
Talking machine..... H. W. Johnson
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Telegraph sounder attachment..... J. F. Mickey
Telemotor for steering ships or other uses..... M. Pfatischer
Telephone attachment..... W. S. Haddock
Telephone desk standard..... C. L. Boyce
Telephone exchange switchboard apparatus..... F. R. McBERT
Telephone system. Two wire multiple..... J. W. Lattig et al
Telephone transmitter..... J. W. Lattig et al
Telephone trunk lines. Apparatus for through ringing on..... J. L. McQuarrie
Tensional lock for adjusting screws..... C. F. Splidtorf
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Ticket and destination check or transfer combined..... F. I. Welch
Time recorder ribbon feeding mechanism..... A. N. Palmer et al
Tire..... W. Sherbondy et al
Tire protecting device. Pneumatic E. Lapisse
Tongue shaping machine..... C. W. Borg
Tool motor. Portable..... P. La Court
Torpedo grenade..... A. Baumgart
Toy..... S. Brom
Toy gun..... A. L. Reid et al
Toy sliding axle..... E. P. Lehmann
Track gage..... R. D. Billington
Traction wheel..... W. D. Cottrell
Tramway block. Gravity..... A. D. Foote
Trap..... B. O. Tilden
Trolley harp..... E. D. Rockwell
Trolley wheel..... W. T. Wilkinson
Trousers protector..... R. Fox
Trousers stretcher..... W. S. Wallace
Trousers stretcher and hanger..... L. Geisert
Truss..... B. Lindman
Tuning device..... D. M. White
Turbine wheel. Elastic fluid..... J. Wilkison
Twisting apparatus. Yarn..... A. E. Rhoades
Type writer. Card..... J. F. Allard
Type writer escapement mechanism..... C. D. Rice et al
Type writing machine..... A. M. Smith
Umbrella frame..... P. Serge-Kisslow
Valve..... I. N. Moore
Valve cage. Pumping engine..... W. Miller
Valve. Convertible..... J. L. Berkey et al
Valve for blowing engines. Automatic air discharge..... A. K. Rarig
Valve reseating device..... I. A. M. Lockett
Valve. Safety..... P. Bode et al
Valve seats. Securing..... J. E. L. Ogden
Vehicle brake..... L. G. Nilson
Vehicle chain adjustment. Motor..... H. Ford
Vehicle, especially that used on common roads..... B. J. Diplock
Vehicle lubricator..... H. B. Burdick
Vehicle rub roller..... C. G. Walker
Vehicle spring. Pneumatic..... B. F. Teal
Vehicles. Brake leather holder for road..... J. J. Russell
Vehicles. Transmission gearing for motor..... C. Schmidt
Veneer trunks or other hollow packages. Press for wood..... H. Komunder
Vessel. Containing and dispensing..... L. Blatz et al
Vibrator..... B. L. W. & E. L. Hanfeld
Vise. Pipe..... G. W. Bufford et al
Vitroous articles. Apparatus for use in uniting..... F. M. F. Cazin
Wagon and operating table. Combined hospital..... P. K. Bechtel
Wagon draw hool and draw bar..... P. D. Doyle
Wagon. Dump..... T. Fauder
Wagon. Dump..... H. A. Moyer
Wagon. Dumping..... C. S. Pharis
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Wagon. Sand..... S. W. Albertson
Wagon seat. Reversible..... M. A. Schuster
Washer..... C. G. Ette
Washing machine..... P. Cunneen
Washing machine..... S. W. Anderson
Washing machine..... E. L. Davis
Watchcase opener..... R. H. Paar
Watch charm..... J. McLean
Water gage..... E. C. & C. B. Wood
Water heater..... G. H. Minier
Water heater or steam generator..... A. W. Finlayson
Water purifier..... F. G. Kune
Water purifying apparatus..... F. G. Kune
Water purifying apparatus..... R. H. Wiles
Water purifying tank attachment..... W. Curtis
Weed cutter and cultivator. Combined..... L. C. Preston
Weighing machine. Automatic..... A. W. Livingston
Weighing machine with sliding weight..... E. Steiger
Welding mechanism. Lap tube A. M. Saunders
Well sinking apparatus 2 pats M. T. Chapman
Wheel construction..... W. A. Gilmer
Wheel structure. Loose..... W. L. Austin
Window construction..... E. H. Lunken
Window lock..... B. Phelps
Wire drawing machine..... E. H. Carroll
Wire stretcher..... N. H. Sturgis
Wire stretcher..... D. Donald

Wire tightener..... J. Riley
Wire working tool..... N. J. Tate
Wood graining machine..... B. W. Augustine
Work carrier..... G. A. Ensign
Woven interlining fabric..... G. S. Cox
Wrench..... R. J. Cosseboom
Wrench and vise. Convertible..... W. P. Foster

DESIGNS.

Badge..... C. L. Jennings
Badge. Campaign..... S. I. Van Dersal
Button hooks or similar articles. Handle for..... S. A. Keller
Casket trimming..... W. E. Stevens
Coat and hat rack..... J. Dyer
Hammock cloth..... D. W. Shoyer
Paper cutters or similar articles. Handle for..... S. A. Keller
Rug..... 6 pats. E. H. Bennett
Stove..... G. W. Cope et al
Upholstery fabric..... P. Bonnet

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Account registering system..... J. F. Schmitt
Adding and recording machine A. P. Simpson
Addressing mechanism..... A. Eschenbach
Advertising apparatus..... J. B. von Rudiger
Aerial vehicle or other structure..... A. G. Bell
Air trunk separator with air replenishing device. Endless..... E. R. Draver
Aluminum. Manufacture of..... W. Rubel
Amalgamating machine. 2 pats. F. J. Hoyt
Amusement device. Coin operated..... A. Martindell
Antiseptic compound and making same..... H. Endemann
Apparel. Combination wearing A. H. Dessart
Astronomical apparatus or planetarium..... U. G. Houston
Auger..... G. A. Stanger
Awning. Window..... J. T. Johnson
Axle box. Car..... E. Denegre
Barrel or cask. Metal..... B. S. Whyte
Bath tub overflow valve..... G. M. Weigel
Battery cell. Storage..... P. Figuccia
Bell..... R. H. Mayland
Belt fastener..... E. W. Blake
Belt fastener..... C. W. Breckenridge
Belt tightener or stretcher..... J. E. Griffen et al
Blasting..... C. O. Frye
Block molding press. Composition G. F. Fisher
Block press..... R. G. & A. Arnsen
Boiler furnace..... C. Schweizer
Boiler stand..... E. L. Walcott
Boiler stay bolt..... J. Peters et al
Boilers. Apparatus for maintaining the water line in steam..... G. I. Rockwood
Bolt and nut lock..... E. R. Post
Bolt cutting machine..... C. W. Dehn
Bookbinder. Perpetual..... R. H. Collins
Bookbinding..... F. P. Nourse
Book clamp..... J. N. Bostick
Book finisher's stand..... V. Kling
Book. Loose leaf..... H. C. Miller
Bottle cleansing machine..... H. Tersling
Bottle. Non refillable..... J. S. Lambe
Bottle protector..... G. L. Kestner
Bottle stopper..... C. Schenert
Bottle stopper..... J. Reddick
Bottle stopper..... F. Illes
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Brake mechanism. Hand..... J. Maguire et al
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Brick or tile cutter..... B. E. Bechtel
Bridges. Foundation anchor for P. P. Carver
Brooder..... G. Hacker
Brooder heating and ventilation system..... G. Hacker
Brush. Rotary tooth..... H. E. Tague
Brush. Shaving..... G. Koch
Bubble blower..... P. D. Horton
Buckets. Means for discharging materials from..... H. A. L. Barry
Buckle. Back band..... C. Smallwood
Buggy wrench..... R. M. Ware
Butter, &c., cutter..... R. Pozzi
Cabinet. Kitchen..... V. O. Rosser
Calculating apparatus..... A. B. Bly
Calculating machine. Interest and percentage..... W. M. Braly
Calendar for pencils, &c..... F. Spillane
Calipers and dividers. Combined..... A. Solo
Cap. Bathtub..... J. Toober
Car. Convertible..... W. H. Howenden
Car frame and making it. Tank..... E. I. Dodds
Car indicator. Tank..... A. D. Whittemore
Car loading or unloading apparatus J. M. Posey
Car. Mine..... W. E. Hamilton
Car. Railway..... I. W. Phelps
Car roof..... S. Hatasbata
Car. Steel side dump..... W. O. Olden
Car wheel and axle..... W. A. Honeyman
Carburetor for explosive engines..... E. H. Clay
Cardboard. Manufacturing faced..... E. Oeser
Carriage top support..... J. M. Peyton
Cartridge clip..... E. O. Goss
Case making machine. Round corner..... J. B. Gury
Caster..... C. H. McCauley
Cement. Carborundo. L. E. dit L d'E Muller
Centering support. Extensible..... 2 pats. G. B. Waite
Centrifugal machine..... G. Pott et al
Chairs, &c. Adjustment for Morris W. P. Seng
Charm..... L. E. Hachelle
Check distributor. Individual..... J. T. Hicks
Checkrein loop..... J. C. Averill
Cheese cutter..... E. L. Heizer et al
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Clamp fastening. Split ring..... E. Kottusch
Clock. Electric..... 2 pats. H. Scott
Cloth singeing machine..... J. Edmunds
Clothes stick..... J. F. Stocking
Clutch..... P. A. Houghaling
Clutch. Hub..... C. M. Rhodes
Coal briquets. Forming..... E. H. Larkin

Coaster brake..... C. Glover
Coat. Automobile..... R. Fox
Coffee drier..... D. Gordon
Coffee pot..... C. Frank
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Concrete pile..... G. B. Poor
Contact breaker..... J. B. Schug
Conveyers. Switch off device for endless..... F. O. Crowley
Conveying apparatus..... J. Haley
Conveying bridges. System of control for..... A. C. Eastwood
Copy holder..... F. J. Bueuzle
Copying machine..... R. Schweers
Corn husking device..... F. E. Waller
Corn husking machine..... J. D. Hidy
Corn silker..... C. H. Plummer
Corset stay..... F. A. Russ
Cotton chopper and cultivator..... M. O. Carter
Cultivator..... R. L. Harper
Cultivator..... J. L. Buckingham
Cultivator, planter, and fertilizer distributor..... J. R. Brown
Cultivator. Three-row..... W. F. Cochran
Curtain fixture..... P. Page
Cuspidor..... H. E. Marlett
Cutting tool..... H. Dyer
Die or pattern cutting machine F. P. Pfeighar
Die press..... H. C. H. Walsh
Display stand..... J. L. Parker
Door alarm. Automatic..... P. Bourne
Door or window lock..... W. F. Martin
Door stop..... R. W. Byers
Door structure. Revolving..... T. Van Kannel
Dovetailing machine..... G. McMurtrie
Draft gear. Cushioning..... J. F. Raders
Dredge. Clam..... J. H. Hall
Dress protector..... R. Fox
Dress suit case..... J. M. Katz
Dress suit case frame..... J. Vranek
Drum. Musical..... O. E. Meinel
Dust collector..... R. L. Hollingsworth
Eggs for brooding purposes. Protector for..... W. A. Dejaruatt
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Electrical conduit..... J. B. Winialey
Elevator..... A. Winarski
Elevator door locking mechanism J. S. Muckle
Elevator safety appliance..... H. J. Cook
Elliptic spring..... C. E. Goodyear
Emergency coupling..... G. J. Hubbard
End gate. Wagon..... P. Gnatzig
Engine..... J. Dodd
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Exhibitor. Goods..... P. J. & J. J. Koll
Expanding mold..... L. Cuatt
Eye exerciser and tester. Pneumatic..... G. E. Lundgren
Eyeglass guard..... L. F. Adt
Farm gate..... L. P. Rollins
Feed water regulator..... 2 pats. L. B. Fulton
Fence stretching lever. Wire..... L. S. Doan
Fireplace heater..... J. Sim
Fireproof metal window frame and sash..... W. B. Gervais
Flat iron heater..... L. J. Kurtz
Floor register..... J. T. B. Slater
Fluid actuating mechanism..... R. Conradar
Fluid meter..... J. W. Ledoux
Food receptacle..... G. Hacker
Form for packing and exhibiting garments. Expandable..... J. G. Bixby
Freezing mechanism..... R. A. Dewsberry
Friction brake. Automatic..... A. Sedgwick
Fruit jar..... W. Richards
Furnace feeder..... J. Roger
Furnaces. Attachment for section tempering..... J. A. Weeding
Furnaces. Compensating terminal for electric..... H. N. Potter
Garment..... I. L. Marrow
Garment. Infant's..... C. Burkland
Gas generator damper valves. Mechanism for operating..... J. Zander
Gas lighter. Automatic..... F. M. D'Arzi
Gas. Manufacturing..... A. Bougaunt
Gas meter..... L. Millet
Gas meter diaphragm..... A. Henning
Gas producer..... W. O. Amsler
Gas producers, furnaces, &c. Apparatus for the continuous feeding and distributing of material in..... C. W. Bildt
Gate..... G. R. Penn
Governor..... C. Pfeiffer
Grain drill, cultivators, or like implements. Means for adjusting..... F. A. Lake et al
Grain separator..... A. E. Sable
Grain separator and thresher..... T. Parrott
Grate. Fireplace..... H. E. Moomaw
Grip for exercising purposes. Spring..... A. E. Terry
Gun loading appliance..... C. P. E. Schneider
Gun. Single trigger double barrel..... H. A. A. Thorn
Halter and bridle..... C. Severus
Halter and weaner. Combined..... C. J. Lord et al
Hand covering..... J. I. Prorby
Harrow. Disk..... G. Smith
Harvester..... J. C. Claunch
Harvester. Cotton..... T. H. Price
Harvester elevator..... E. A. Johnston
Harvester throat adjusting device. Corn..... E. A. Johnston
Hat pressing machine clamp..... V. J. Lawson
Hat sunshade..... W. C. Cleveland
Heat and smudge composition..... E. J. Griffiths
Heat conducting tube..... R. C. Monieagle
Heating cooling, ventilating, and lighting system. Building..... O. F. Petersen
Hinge..... W. Lovette
Hoisting and conveying apparatus..... Y. Tamamura
Hoop staple. Barrel..... F. B. Shuster
Horseshoe attachment..... J. H. Fink et al
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Impact motor..... E. Huber
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Insulated joint..... G. A. Weber et al
Insulating fixture support..... A. McMurtrie

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Journal lubricator G. F. Godley
Key frame..... G. A. Zundel
Knitting machine fabric slitting device H. W. Folsom
Label and tag..... W. P. Butes
Lamp F. Lehmann
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Lamp. Electric arc L. Wolff
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Latch. Night or dead lock..... S. R. Slaymaker
Lathe back rest..... N. Lentz
Lathe driver D. H. Teas
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Liquid drawing apparatus J. M. Doehrer
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Lock and rose..... N. W. Crandall
Locomotive alarm apparatus..... H. G. Sedgwick
Locomotive cross head..... W. Mitterreiter
Loom for weaving terry fabrics J. H. Margerison
Loom heddle J. Grob
Loom jacquard machine..... G. H. Brown et al
Loom shed forming mechanism..... R. Crompton et al
Loom shuttle box control mechanism C. & W. W. Peck
Loom stop motion H. J. Jarry et al
Loom tilting reed mechanism E. W. Davenport
Magneto generator..... H. Hess
Mail distributing bag. Rural..... W. Corfman
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Map and machine for operating same. Movable..... T. Ikemori
Map. Road L. J. Carter
Massage apparatus C. Adams-Randall
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Match box, cigar cutter, and lighter. Combined..... M. McDermott
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Placket closing device..... A. Wildman
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Telegraphic key. Interchangeable W C Dean
Telegraphy or transmission through space. Wireless A. Artom
Telephone exchange system..... 2 pats..... W. M. Davis
Telephone. Single wire selective signaling and intercommunicating J. A. Brown
Telephone switchboard switch or ringing key L. M. Ericsson
Telephone toll apparatus. Register and alarm mechanism for..... G. A. Long
Telephone transmitters. Detachable and antiseptic mouthpiece for..... C. D. Wright
Telephonic relay I. Kitee
Telescoping mechanism H. E. Bayly
Thermal inductor..... T. B. Kinraide
Thermometer T. H. Wurm et al
Ticket or check delivering machine W. H. Champlin
Tile making apparatus G. Jaeger
Tire. Detachable pneumatic..... C. S. Scott
Tire. Vehicle wheel C. Burnett
Tongue construction. Vehicle S. L. Geddes et al
Tool. Combination W. H. McLeod
Tool handle. Detachable W. Ashert
Tool holder..... reissue..... J. Hunter
Toy E. A. Reineman
Toy cash register..... W. L. Dunham
Toy. Spirometer..... H. G. Cady
Trap H. H. Holmes
Tray or table. Self tilting..... R. Harvey et al
Tree protector..... L. B. Haggerty
Truck J. E. Kelly
Truck. Barrel S. B. Mansfield
Truck. Hand J. T. Cox et al
Tube cleaner G. C. Quasebarth
Tuck marking attachment S. A. Swart
Type casting machine type ejecting device..... J. Mayer et al
Type machine mold dimensioning mechanism J. S. Bancroft
Type writing machine W. W. Torrence
Type writing machine platen shift mechanism G. M. Kitzmiller
Umbrella frame joint..... G. B. Vogel
Undergarment..... L. H. Seitz
Valve C. L. Scoville
Valve. Automatic release..... N. R. Maus
Valve. Engine J. B. Allfree
Valve. Flushing..... T. C. Beaumont

Valve for leach tanks..... A. A. Stewart
Valve gear P. Dietz
Vehicle..... M. L. Sanderlin
Vehicle brake. Motor..... C. Schmidt
Vehicle. Pneumatic tired C. Mercader
Vehicle running gear..... A. F. Madden
Vehicle speed controller. Motor..... J. L. Fitz Gerald
Vending machine..... C. A. Gunder
Vest..... J. Engel
Voting machine N. B. Ross
Wagon. Dumping C. G. Streich
Walks, stairways, &c. Approach to movable G. F. Cahill
Wall structure G. B. Waite
Washing machine..... T. M. Kirkwood
Washing machine..... J. S. Ruth
Washing machine B. Wilhelm
Water heating apparatus A. P. Bromell
Water motor J. P. Shevlin
Water raising or forcing apparatus. Compressed air operated..... E. Gaucher
Water tube boiler J. P. Sneddon
Weather strip W. Steger
Weather strip C. M. Rhodes
Web interlacing machine A. E. Sexton
Weighing apparatus. Liquid..... C. Cooper
Wheel block H. P. Stullken
Wind wheel..... C. H. Smith
Window cleaner..... F. H. Curtis
Window opening or shutting appliance K. Rodestab
Wire netting. Machine for making..... F. Johanson
Wrench J. News
Wrench C. H. Ritts
Wrench J. Lill
Wrench C. D. Paul et al
Wrench O. S. Randall
Wrist pins, &c. Mechanism for turning..... S. McMillen
Yeast M. P. Davies et al

DESIGNS.

Chaplet or shrine of the holy rosary..... C. Gay
Folding chair..... H. C. Strobel
Fork, spoon, or similar article C. A. Bennett
Fork, spoon, or similar article..... E. Meyers
Grave guard A. A. Ehlman
Mirrors, brushes, or similar articles. Back for..... W. Turton
Spoon or similar article..... C. A. Bennett

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MECHANICAL PATENTS.

Accoutrement..... H. R. Lemly
Accumulator plates. Machine for making C. Francke
Acids. Making dialkylbarbituric..... E. Fischer
Adding machine..... W. R. Staples
Advertising and showing machine. Automatic revolving A. Mariolle
Advertising purposes. Scintillating device for..... F. Seary et al
Air compressor pressure control..... 2 pats E. H. Steedman
Air cushion for vehicles M. Downer
Air separator brush holder C. H. Lane
Ammonia water apparatus..... H. A. Abendroth
Annunciator T. W. Gleeson
Apartment construction..... W. C. James
Aurora borealis. Projecting imitations of the J. Menchen
Axle cutter. Combined..... A. Ingram et al
Axle. Vehicle F. M. Foster
Bait. Trolling..... H. P. Barnhart
Baling press J. R. Pumphrey
Bandage rolling machine. Plaster B C Leavitt
Bank and register. Cyclic..... O. R. Myers
Barrel soaking and rinsing machine..... H. Reininger
Basket machine..... C. Engberg
Beamless brake..... T. W. Saling et al
Bearing for spindles. Ball..... C. Sella
Bearing. Hanger G. E. Carter
Bearing. Thrust..... W. C. Baker
Bed bottom J. G. Venable, Sr
Bed or couch F. W. Boecker
Bedstead G. F. Honold
Beet toppler D. T. Blevins et al
Bell for whistles. Tubular chime W. Bodette
Biggin J. Koenig
Binder R. S. Robson et al
Binder frame. Loose leaf F. Grimme
Binder gleaner attachment..... A. P. Patterson
Blackboard compound L. Hornor
Blacking machine L. Wimmer
Bleaching barytes and recovering Glauber salt W. D. Gilman
Boiler cleaning compound N. Lopez
Boiler furnace J. S. Roake
Boiler water gage..... E. F. Shallow
Bolt and nut lock J. Leighton
Bolt clipper. Gig saddle..... O. O. Harris
Bolting machine cloth cleaning brush. Flour L. Jones
Book holder and writing table. Combination W. D. Bellamy
Bookcase. Revolving S. M. Holt
Boring apparatus..... W. S. Sutton
Bottle S. E. George et al
Bottle capping machine..... G. H. Gillette
Bottle. Non-refillable..... S. E. George et al
Bottle. Non-refillable..... E. F. Hamilton
Bottle. Non-refillable P. T. Clark
Bottle stopper C. W. Geekie
Bottle washer H. E. Decker
Bottles. Device for preventing refilling of..... F. A. Busse
Bottles, jars, or other receptacles. Closure for..... D. C. Hull
Bottles or other vessels. Cap for..... J. A. Jones
Box W. J. Walker
Brake shoe H. L. Winslow
Brick provided with vitreous or glass face..... J. W. Hayward
Brick repressing machine..... C. W. Pugh
Bride M. M. Stokes
Brooder W. S. Small
Broom winding machine..... J. C. Singleton
Brush E. Kelchior
Brush for doors. Fly..... H. H. Hoyt
Building block molding machine H E Goodwin
Bullets. Swaging conoidal-end..... W. Mason
Cabinet. Revolving S. M. Holt

Camphor. Making K. Stephan et al
Cane and stool Combination J. Manderson et al
Canister top A. S. Lyhne et al
Cap cutting gage W. C. Fenimore
Car bolster. Dumping..... M. Poshee
Car coupling. Automatic..... J. J. Swint
Car door H. D. Smart
Car gallews frame. Hand..... J. Donovan
Car striking plate and carrier iron support..... C. A. Lindstrom
Car. Telescoping..... J. D. Barber
Car ventilating means..... L. C. Lanphear
Carbureter for explosion engines E C Richard
Cement. Manufacture of acid proof and impermeable..... R. Liebold
Cement. Manufacturing material designed for the production of P. Steenbock
Cement. Manufacturing vitreous P Steenbock
Cement testing machine..... A. W. Cash
Chair seat cover L. Lippert
Chart for business exchanges. Indicator..... A. J. Delavigne
Chuck and rotating device. Combined rock drill..... G. H. Gilman
Chuck. Stay bolt..... B. S. Dustin
Chucking device..... W. L. Abate
Chute for dredging machines..... M. Herron
Classifying or sizing apparatus A Ten Winkel
Clock. Program C. L. Hayes
Clothes pounder..... I. N. Hollingsworth
Coal breaker W. J. Patterson
Coal for coking purposes. Treating and handling W. J. Patterson
Cock for steam boilers. Gage J. W C Prochnow
Cock. Safety gas..... E. D. Booz
Collar. Horse W. B. Estes
Compound G. S. Yingling
Concrete and iron structure..... C. Redlich
Controller apparatus..... P. S. Barrett
Cooker. Automatic steam..... W. F. Herdrich
Cooking utensil or other vessel..... F. H. Blankley
Copy holder J. F. Pierce
Cotton picker C. B. Shreeves
Crate. Folding metallic..... O. P. Galer
Crate. Shipping..... W. J. Corner
Cream separator. Centrifugal..... N. W. Gales
Cross tie and rail fastener. Metal..... B. S. Sawyer et al
Crown and bridge work. Device for securing artificial bisulpsids or molars in J. R. Mitchell
Cultivator attachment..... P. L. Sleeper
Cultivator attachment..... L. S. & C. T. Hinkson
Cultivator. Disk A. P. McKay
Currency. Post check..... I. D. Worcester
Cutter bar..... E. E. Silor
Cutters. Machine for forming curly knife edges on rotary..... E. Schreder
Dam. Metal J. L. Holmes
Dental mouth prop and mirror, check distender, &c..... W. Hare
Dental use. Combined mouth prop tongue protector, &c. for..... W. Hare
Diaper..... H. B. Campbell
Dish S. Frost
Dish washer and churn D. B. Kenney
Displaying device P. J. Hynek
Door check E. J. Wells
Door opener..... reissue..... G. Rischmuller
Doubletree F. L. Wolverton
Dough mixer..... W. H. Butler
Dough mixing and kneading apparatus..... C. F. Hudson et al
Draft equalizer..... C. F. Holzworth
Dress shield O. W. Hull
Drier, feeder, and discharge. Combined..... F. A. Hetherington
Drying apparatus. Tubular..... M. Salzmann
Drilling machine F. F. Hepler
Drilling machine spudding attachment..... W. L. Barton
Driving mechanism..... C. Waters
Driving mechanism..... F. P. Pfeighar
Dust extractor A. B. Lipp
Educational concentrator..... J. F. Barker
Egg beater W. V. Paley et al
Electric material. Incandescent..... A. Voelker
Electric motor E. S. Pillsbury
Electric motor..... E. S. Pillsbury
Electricity. Apparatus for registering the supply of C. Kapp
Embroidering machine..... G. L. Bourquin et al
Engines. Firing locomotive..... W. H. Strouse
Engines. Ignition plug for explosive..... W. Roche
Envelop and letter sheet for same..... G. Archibald
Exercising machine..... E. W. White
Explosive engine H. Sohnlein
Fare register rod operating handle A. H. Hall
Faucet H. A. Schroeder
Faucet attachment..... M. A. Sheldon
Fence J. D. Paldi
Fence loom web magazine. Wire V. Hoxie
Fence post G. Calkins
Fertilizer distributor..... J. C. Sparks
Fertilizer distributor..... J. G. Daniel
Fifth wheel D. McCausland
Fire escape..... J. Iron
Fire extinguisher for textile machinery..... R. McArthur
Fire extinguisher sprinkler head. Automatic J. Hunt
Fireproof shutter..... S. B. Sexton, Jr
Fish plate..... P. B. Bieman
Flange..... F. C. Billings
Flange wrench..... C. F. Stone
Floating naval battery..... A. P. Stokes
Fluid motor C. F. Fogg
Fodder cutter..... J. Dick
Folding box..... G. Maunsell Smyth
Foot tub J. A. Caldwell
Fraying machine. Goods J. M. Deen
Fruit pitting machine feeder..... J. S. Briggs
Fuel. Manufacture of artificial..... P. Grayson
Furnace..... G. S. Kent
Furnace..... R. H. McCoy
Furnace cooling device. Blast..... L. Keyling
Furnaces or converters. Extracting moisture from air for blast..... J. Gayley et al
Gage or lubricator glasses. Protecting shield for..... E. C. Mead
Game C. J. Malings
Game table..... P. I. Sausen
Garment hanger S. N. Cragin
Gas and air mixing apparatus..... C. C. Dodge
Gas burner. Automatic regulating G W Lord
Gas burner. Safety..... J. Spiller

Gas engine..... E. C. Richard
Gate..... W. P. & W. P. Elliott, Jr
Gearing. Change speed..... A. B. Landis
Gearing. Variable speed transmission..... T. B. Rennell
Glass. Apparatus for forming threads on..... F. Wackenhuth
Glass clamp Plate..... W. G. Soule
Glass furnace..... H. Hilde
Glass making apparatus. Sheet..... J. P. Taylor
Glassware with liquid gold. Decorating..... H. Northwood
Grain drill feed roller..... H. D. Frenking
Grain dump. Portable..... E. R. Sheille
Grinding machine work rest..... A. B. Landis
Ground detector. Three phase..... P. MacGahan
Guitar zither Accompaniment..... M. Kolander
Gun carriages. Elevating and traversing gear for field..... F. G. Hughes
Gun. Machine..... F. Kober
Harrow or cultivator..... H. U. Wakefield
Harrow tooth fastening..... J. Porteous
Harvester and shocker. Corn..... S. A. Bates
Hat holder..... H. R. Tubman
Heat catcher..... G. Thomson
Hitching device..... J. G. Michaeli
Hoist..... S. T. Wallace
Hoisting apparatus guide sheave..... J. W. Hollenbeck et al
Horn or other material. Machine for treating strips of..... J. F. Martiu
Horse detacher..... A. S. Chivers
Horseshoe..... 2 pats..... J. M. Myers
Hose coupling..... S. M. Rhoads
Hot air furnace..... A. J. Randall et al
House construction. Space economizing..... W. C. James
Husking roll..... B. R. Benjamin
Incandescent mantle supporting device..... A. R. Selden
Incubator..... F. W. Iden
Incubator egg turner..... W. E. Campbell
Index marker. Card..... G. F. Williamson
Inksand. Automatic..... H. M. Sturgis
Insulator..... J. F. Gill
Insulator. Third rail..... R. V. Dunbar
Jar..... J. W. Kunkel et al
Jar closure..... W. E. Brown
Jewel mounting..... A. A. Boismaire
Jewelry..... M. L. Weiss
Journal box..... W. H. Emerick
Kinetoscope..... A. E. Smith
Knitting machine..... D. F. Sullivan
Lamp..... G. Washington
Lamp..... J. F. W. Jost
Latch..... C. F. Scheel
Latch. Gate..... F. Jentz
Lead. Manufacture of white..... J. Oetli
Lens boxes..... J. Merchen
Lifts or hoisting machine. Controlling device for electrical..... H. Stahl
Linotype machine. Multiple magazine..... 3 pats..... P. C. Lawless
Liquid separator liner. Centrifugal..... N. W. Gales
Locomotive turn table..... W. S. Mullin
Log car standard..... M. D. Liverman
Loom and weft replenishing mechanism therefor..... E. E. Shelters
Loom harness mechanism..... V. A. Ledoux
Loom shuttle. Weaving..... A. Abegg
Lubricator..... J. H. A. Fottg
Lumber transfer device. Automatic..... D. C. Prescott
Manhole ventilator..... D. L. Davis
Mattress. Bed..... H. Kintz
Mattress stuffing machine..... C. W. Johnson
Measure..... C. A. Shumate
Measuring water for irrigation or similar purposes. Apparatus for..... C. J. Grant et al
Mechanical movement..... A. Wood
Mercerizing apparatus. Yarn..... I. E. Palmer
Metal roughing and finishing mills. Spring balance for..... W. H. Bailey
Microphone..... E. B. Fahnestock
Milk Condensing..... S. R. Kennedy
Mine track system..... J. Whitehead
Mineral substances by means of the selective action of oil. Separation of..... C. Kendall
Miter box..... J. A. Traut
Mixer..... F. A. Hetherington
Motor..... E. S. Pillsbury et al
Mouthpiece hygienic appliance..... H. L. Cutler
Mower..... I. A. Barberg
Mower bunching attachment..... E. A. Johnston
Mowing and harvesting machine cutter mechanism..... J. W. Crates
Mowing machine buncher..... J. Gregg
Muffler..... W. J. Hewitt
Mules and spinning frames. Driving cylinder for..... H. E. Getchell
Musical instrument. Automatic..... E. de Kleist
Necktie. Endless..... J. P. Leggett
Necktie fastening..... J. Bernstein
Nozzle. Syringe..... R. F. Coleman
Nut and bolt lock..... R. M. Tuller
Nut lock..... D. W. Martin
Nut lock..... C. B. Fudge
Nut lock..... F. C. McCutchen
Oat hulling process..... D. W. Brown
Oil burner. Fuel..... J. A. Toomey
Ore separating apparatus..... H. F. Campbell
Ore washing or concentrating machine..... E. A. Wall
Orograph instrument..... H. G. J. Stang
Packing. Piston rod..... H. P. Rhodes
Paper board, &c. Means for drying..... T. W. McFarland
Pasteurizer, cream ripener, churn, and butter-worker Combined..... D. W. Payne
Peat fiber for manufacturing half stuff. Apparatus for the treatment of..... C. Esser
Pencil. Lead..... C. W. Padan
Permanent way..... J. C. Werckmeister
Pie marker..... O. L. Weimar
Pipe coupling. Automatic train..... C. B. Dickerson
Piston rod extension..... I. D. Morgan
Placket fastener..... R. D. Slater
Plane. Self oiling..... J. Weyland
Planter. Seed..... E. J. Gould et al
Planters and drills. Gage plate attachment for..... D. R. Vivion
Plastic mold..... F. D. Davis
Pneumatic despatch system..... F. S. Smith
Pole changer..... W. I. Thomson
Portable post..... H. S. Gay
Post office box..... W. & M. H. Folsom
Pot hanger and plant lifter. Adjustable..... H. C. Chessman
Pulley..... C. Giraud

Power transmitting device. Variable speed..... W. F. Howe
Pulley. Sash..... G. C. Gardner
Pump head..... S. M. Fulton
Pumps. Automatic controller for feed..... R. J. Mullin
Punch. Portable..... J. H. Childester
Punching bag attachment..... K. C. Roe
Puzzle..... E. G. Jackson
Rail clamp..... J. F. Kelly
Rail joint..... H. H. Wrench
Rail joint..... C. O. Minor
Rail joint..... H. Hines
Rail joint..... F. C. Shellito
Rail joint washer. Elastic..... C. Spiegel et al
Rail system. Third..... L. M. La Barr
Railway Amusement..... A. E. W. Frazer
Railway block signaling system..... C. T. Morey
Railway crossing signal..... E. W. Vogel
Railway rail spring..... G. W. Smith
Railway signal circuits..... E. W. Vogel
Railway signal system..... W. A. Kibbe
Railway switch safety lock..... F. C. Anderson
Railway third rail. Electric..... A. F. Chase
Railway tie. Metallic. 3 pats..... H. W. Avery
Railways. Signaling system for electrically operated..... L. B. Stillwell et al
Range finder..... N. Tobin
Razor. Safety..... M. A. Mihills
Reclining chair..... F. Grover
Refrigerator. Portable..... E. Johns
Registering lock..... J. G. Ramey
Relay..... J. C. Barclay
Road gate. Automatic..... H. Kirch
Roof framing tool..... J. W. Morrison
Rotary engine..... W. M. Byrd
Rotary engine..... G. V. Anderson
Rotary engine. Explosive..... M. Beck
Rubber sponge cup..... T. C. Marshall
Rule holder..... W. O. Bell
Saddle Riding..... L. A. Lohr
Safety hook..... C. H. Terry
Safety switch..... G. H. Hill
Saw attachment. Band..... E. L. Hayden
Saw mill Band..... L. J. Hanhart
Sawing machine..... O. L. Roberts
Scale..... J. Hopkinson
Scale..... A. U. Smith
Scale. Computing..... A. B. Hayden
Scale. Price..... L. T. Johnson
Scale. Price indicating..... 2 pats..... I. C. Koehne
Scale. Spring balance..... A. U. Smith
Seal. Car..... W. M. McIntosh
Seal. Meter coupling..... W. H. Larabee
Separating, grading, and polishing machine..... C. T. Rowland et al
Sewing machine feed mechanism..... C. E. Hadley
Sewing machine. Shoe..... H. H. Duchesne
Sewing machine. Shoe..... E. E. Bean
Sewing machine slack thread controller..... H. Manning
Sewing machine tuck accessory..... F. Finlay
Shade fixture. Window..... C. A. Scheif
Sharpening Tool..... D. W. Hattel
Sheet metal boxes or cans. Making..... B. Adriance et al
Shoe..... H. F. Rooney
Shoulder protector..... H. Glover
Shovel..... H. W. Avery
Shovels. Making..... H. W. Avery
Shutter fastener..... A. B. Landis
Sieve cloth cleaner..... W. Bonfield
Singeing pigs' feet, &c. Apparatus for..... N. A. Saxler
Sinks, lavatory basins, &c. in earthenware. Machine for molding..... R. Stanley
Sleigh..... P. Fletcher
Snap fastener. Ball..... A. J. Bradley
Spectacle frame..... I. Fox
Spectacles..... H. Heeren
Speed mechanism. Variable..... W. D. Cussard
Spinning machine..... E. Gessner
Spinning ring..... H. B. Hoyle
Spoon holding device..... R. R. Pyle
Stacker. Hay..... F. J. Pavlik
Stacker hood. Pneumatic..... F. Bechtel et al
Stamp. Adjustable printing..... A. J. Bradley
Steam engine..... B. M. Schauman
Steam engine..... O. F. Redhaver
Steam generator regulator. Automatic..... I. T. Danks
Stone from magnesit. Manufacturing artificial..... C. Groyen
Stone sawing machine..... J. B. Hanley
Stovepipe holder..... C. B. Wassom
Straw feeding machine..... G. P. Griffin
Suspender attachment..... L. Selikowitz
Switch lever lock..... N. Jamison
Switch locking device..... M. P. J. Nemmert
Swivel joint..... C. E. Fenstermacher
Table or counter cover attachment..... A. A. Guardia
Telegraphing means..... J. Beard
Telephone line switching mechanism. Intercommunicating..... A. K. Andriano et al
Thermostat..... J. D. Gould
Thread cutting appliance..... J. H. Tierney
Thread dressing machine..... G. A. Fredenburgh
Ticket and automatic auditing system. Combined..... J. W. Lutz
Tire cover. Pneumatic..... C. B. Buxton
Tire guard. Pneumatic L. Vanderperre-Simon
Tire mold..... C. G. Fawkes
Tire upsetting machine. Wheel..... L. F. Fairbanks
Tire valve. Pneumatic..... J. E. Keller, Jr
Tire. Vehicle..... W. E. Andrew
Tobacco drier..... B. C. & F. Duwel
Tool handle..... H. O. Keferstein
Tool holder..... J. E. Hunter
Toy..... J. E. Zimmerman
Toy..... J. A. Swartz
Toy bank..... A. F. Font
Toy bank. Registering..... G. B. Beale
Tracker bar. Pneumatic..... P. Wnest, Jr
Traction device and emergency brake. Electromagnetic..... C. A. Wells
Transfer..... H. J. Berger
Treatment of material. Apparatus for continuous..... W. H. Gesner
Trolley..... S. Fisher et al
Trolley wheel controller..... F. F. Jackson
Trolling spoon..... R. C. Hornung
Trombone..... J. Heald
Trousers protector..... J. Lux
Truckland shovel. Combined..... F. Erickson
Truck. Freight handler's..... A. W. Cash
Truck. Wheeled..... C. A., Jr., & C. P. McCnirk
Tube retainer..... A. W. Plassmann

Tube welding machine..... W. Byrd
Tubes. Apparatus for the production of..... A. E. Becket al
Tuning hammer..... J. Erlandsen
Tunnel casing or lining..... C. N. Dutton
Turbine. Elastic fluid..... W. J. Cartwright
Turbine engine..... S. N. Smith
Turbine governing mechanism..... J. Wilkinson
Turbine. Steam..... S. N. Smith
Type writing machine..... C. H. Shepard
Type writing machine..... W. J. Barron
Type writing machine..... W. A. Twining
Type writing machine. 2 pats..... B. C. Stickney
Valve..... J. Lally
Valve. Air compressor..... E. H. Steedman
Valve. Automatic..... E. L. Davis
Valve for explosive engines. Feed..... L. Anderson
Valve for steam engine. Balanced..... J. P. McDouough
Valve. Relief..... F. Schreidt
Valve rescating device..... T. B. Williams
Valve. Slide..... J. B. Edwards
Varnishing..... T. P. Anderson, Jr
Vehicle. Covered..... H. M. Norris
Vehicle. Motor..... W. S. Simpson
Vehicle spring and coupling plate..... S. E. Oviatt
Vehicle wheel..... W. C. Potts
Vehicle wheel. Compound..... F. W. Oliver
Vending machine. Coin-operated..... J. A. Rule
Ventilating apparatus..... W. C. Weistone
Vessel hull..... H. N. Whittelsey
Vise..... C. H. Ritts
Vise. Pipe..... E. Renderer
Wagon brake..... W. K. Melton
Wagon gear..... P. Fletcher
Wall Retaining..... W. L. Church
Washing machine..... W. W. Terriff
Water closet bowl..... M. D. Helfrick et al
Water closet bowl..... R. Schmalzack
Weeder..... T. L. Brown
Weighing machine. Automatic..... B. Norton
Whip..... M. O. Felker
Whip making machine..... H. W. Larsson
Window..... O. M. Edwards
Window screen corner clamp..... B. C. Rockwell
Wire stretcher..... O. C. A. Schwiien
Wire support..... C. F. Bettmann et al
Wire tightener..... W. C. Julian
Wood carving machine. Automatic..... F. J. Widman
Wood shaping machine..... F. P. Kelley
Wrench..... R. F. Patman
Wrench..... G. McKercher
Wrench..... A. Wilson
X-ray tube..... C. H. F. Muller
Yoke. Neck..... J. A. Byxbe et al
Yoke. Neck..... H. Peterson
Zinc white. Manufacture of..... J. Oetli

DESIGNS.

Advertising card..... A. Nederland
Seal press body. Hand..... J. Sigwalt et al
Type. Font of..... S. C. Gaunt

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MECHANICAL PATENTS.

Acid condensing apparatus. Nitric..... O. Guttmann
Adding machine..... C. Stahlberg
Adjusting or packing ring..... E. Marold
Advertising vehicle..... J. A. Eldred
Air. Separating dust from dust laden..... W. E. Allington
Air shaft closure..... M. Scholl et al
Album support. Photographic..... G. Schwab
Alloy. Steel..... C. E. Manby
Animal trap..... J. H. Morris
Animals from lolling their tongues. Device for curing..... J. M. Berry
Automobile..... H. Nyberg
Axle. Lubricating..... P. McNaughton
Axles. Safety washer and nut for vehicle..... J. A. Bechtol et al
Bag fastener..... O. R. Luther
Bale tie..... A. Hess et al
Bat. Base ball..... J. A. Hillerich
Bearing for centrifugal machines. Yielding..... C. E. Robinson
Bearing. Roller..... C. W. Warner
Bearing. Side..... F. K. Hosler et al
Bed bottom..... E. H. Hutcheson
Bed bottom. Spring..... F. B. Hemingway
Bedstead head rest..... W. C. Feely
Beehive..... C. Ludloff
Belt or signal cord hanger..... O. Link
Belt fastener..... E. Sirois
Belt shifter..... K. J. Kuyk
Beveling tool..... J. J. Nolan
Bias cutter..... C. J. Mitchell
Billiard cue and tip therefor..... H. Haes
Blind. Venetian..... F. W. Johnson
Boat..... J. Morgenthau
Boiler..... E. H. Schwartz
Boiler..... R. Viand
Boiler..... S. M. Pearson
Boiler setting..... J. M. McClellon
Book. Loose leaf..... G. C. Kimball
Book. Loose leaf..... H. C. Miller
Boring tool..... J. F. Morgenthal et al
Bottle..... P. J. McNamara
Bottle..... R. G. Davis
Bottle..... H. Coale et al
Bottle capping machine..... H. S. Brewington
Bottle closure..... 2 pats..... H. Coale et al
Bottle holder and protector. Combined..... R. Daughirtai
Bottle. Non refillable..... F. Kern
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Bottle washing apparatus..... J. C. Bauer
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Box covering machine fly papering attachment..... I. H. Peck
Brake system. Fluid pressure M. W. Hibbard
Bread..... W. T. Gilmor
Bread forming machine. 2 pats..... C. A. Meurrell
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Brick or block and facing therefor. Building..... T. W. Worrall
Bricks and apparatus therefor. Coating..... M. Perkiewicz
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Brush..... W. A. Geer
Brush. Electric..... A. T. Sanden et al
Bucket. Automatic..... E. F. Atherton
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Burglar alarm..... G. A. F. Streuber
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Calendar. Perpetual..... T. O'Shaughnessy
Camera..... T. J. Burns
Camera..... J. S. Wright
Camera. Photographic roll holder..... F. A. Brownell
Camera plate holder attachment..... J. A. Smith
Can opener..... A. F. Bethge
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Car brake..... W. S. Adams
Car brake..... E. Stevens
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Car coupling..... G. Heinicke
Car coupling..... L. W. Jenkins
Car. Dumping..... 2 pats..... S. F. Swanson
Car fender..... F. R. Keith
Car fender..... J. Bappel
Car haulage system..... H. S. Moore
Car heating apparatus..... E. H. Gold
Car. Metallic passenger..... G. I. King
Car. Semiconvertible..... J. A. Brill
Car underframing..... H. C. Williamson et al
Car wheel..... E. A. Vickroy
Carburetor. Explosive engine C. F. Parmenter
Carpet cleaner..... N. V. Steele
Cartridge packet..... E. G. Parkhurst
Cash register..... W. H. Muzzy
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Cattle guard..... L. W. Carden
Centrifugal switch..... H. G. Reist
Chain. Drive..... J. M. Dodge
Chair..... J. H. Franklin
Change maker..... W. W. Roblyer
Change maker..... W. Johnson
Chuck. Drill..... G. H. Gilman
Churn..... A. L. Griffin
Cigar band. Adjustable..... J. L. Spector
Circuit controller. Time..... R. A. Moore
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Clipper. Hair..... H. E. Conrad
Clock..... W. E. Porter
Clock and circuit controller. Combined coin driven..... T. D. Ingram
Clock. Electric program..... E. E. Stone
Closet connection..... W. H. Lloyd
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Clutch mechanism..... W. L. Barton
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Cock..... A. O'Brien
Cock. Time gas..... A. Hare
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Coil. Reactance..... J. J. Frank
Coin chute fraud preventive..... O. J. Buck
Collector ring..... H. G. Reist
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Control system for parallel lines..... L. Wilson
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Crate..... A. L. Ford
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Cuff and wristband. Combination..... W. E. Howell
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Current motor. Alternating..... A. W. Henshaw
Current transformer. Alternating..... W. S. Moody
Currents. Coin controlled apparatus for heavy..... J. J. Force
Display case..... L. W. Plummer
Display case..... C. J. Johnson
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Distribution and information board..... W. E. Symons
Ditching machine..... S. D. Layton
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Door hanger and track. Sliding..... J. H. Burkholder
Door retainer..... H. F. Good
Door securer..... J. A. Taylor et al
Door support. Automatically acting..... D. Stanley
Douché apparatus..... W. J. Bauer
Drift gear. Friction..... W. B. Waggoner
Drawers supporter..... S. C. Custer
Drawing appliance..... H. C. Robinson
Dress shield making machine..... A. C. Squires
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Easel tray..... E. Eckart
Educational, amusement, or other purposes. Device for..... W. H. Robertson
Egg case..... H. C. Johnson
Electric battery..... I. L. Roberts
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Electric current regulating apparatus..... R. C. Clinker
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Hinge. Separable..... S. F. Meek
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Planter. Corn..... L. P. Graham
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Car. Dump. F. K. Hoover et al
Car elevator. Dump. E. O. Fehr
Car end gate opening device. Mine. S. W. Ault et al
Car fender. J. McGuire
Car underframe. Passenger. C. S. Gawthrop
Carborundum article. Self-bonded. F. J. Tone
Carburetor for gasoline engines. G. Kingston
Carton closing and sealing machine. G. R. Wyman
Cattle guard. W. R. Scott
Center fire balance engine. R. A. Morton
Chain. Extensible. E. C. Gipe
Chain wrench. G. J. Meyer
Check holder and match plate. Combined. M. J. Bevans
Cheese cutter. C. G. Strubler
Chin supporter. S. N. Hiser
Churn. S. Rock
Cigarette tips. Machine for applying. 2 pats. R. Gabrielsky
Circuit closer. Automatic. H. G. Pape
Cisterns. Extensible dome form for cement. S. L. Dunlap
Clip. B. M. Stannard
Clock. Alarm. T. J. Daniel
Clock. Eight day alarm. J. Matzinger
Clock. Electric. T. A. Schlueter
Clothes rack. E. Baruch
Clover hulling machine. A. Poirier
Clutch. P. A. Murphy
Coal auger nut. Sectional. J. H. Mason
Cock. Stop. W. Theis
Coin winding machine. J. J. Frank
Coin collector. F. R. McBerly
Combination furnace. J. F. Hughes
Commutator. J. H. Brown
Composing stick. R. D. Tittle
Compressing and straining machine. F. J. Farner
Compressing machine. M. McGovern
Computing device. Wage. M. F. Teicher
Concrete block molding machine. Rough. T. Podmore
Condenser. J. Grouvelle et al
Controller. M. M. Wood et al
Corn husker. P. Rupp
Cotton gin. C. G. Bodungen
Couch. Curative. J. & W. Titus
Coupling. V. J. Wahlstrom
Crane. Electric. A. C. E. Rateau et al
Crane. Adjustable. H. A. Lewis
Crane. Adjustable. O. F. Persson
Cream separator. Centrifugal. P. E. Shee
Crushing rolls. J. A. Thomas
Crushing rolls. Longitudinally adjustable. J. A. Thomas
Cuff holder. G. W. Buchanan
Culinary boiler or steamer. A. B. Rice
Cultivator. D. Garst
Cultivator. W. W. Giles
Current controlling system. A. C. Eastwood
Current meter. Alternating. W. H. Pratt
Curtain ring. G. A. Springmeyer
Cuspidor carrier. C. H. Gunn
Cylinder lubricator. B. F. Kelsey
Dam. Portable. S. Gleazen
Dental articulator. F. L. Williams
Dental engine and spittoon support. W. B. & E. P. Alford
Distilling apparatus. Water. W. Rochlitz
Door closer. Automatic. J. E. Gates et al
Door hanger. J. Cramer
Door opener. G. Rischmuller
Drain trap. A. W. Edwards
Drill. A. E. Utsler
Drill. W. H. Soley
Drilling tool. E. A. Turner
Dry separator. F. O. Bloom
Drying apparatus. F. Meyer
Dust pan. J. R. Forde
Electric circuit closer and breaker. T. H. McQuowu
Electric conductor protective system. L. Andrews
Electric controller. A. Sundh
Electric controller. A. W. Harrison
Electric heater. H. E. Heath
Electric motor. E. Bretch
Electric or telephonic transmission. H. Carbonnelle
Electric snap switch indicator. C. G. Perkins
Electric switch. F. Mackintosh
Electrical apparatus. Ventilated coil for. N. J. Neall
Electrical distribution system. J. H. Hallberg
Electroplating apparatus. W. R. King
Electrostatic instrument. F. H. Bowman
Elevator. H. R. Wellman
Elevator apparatus. Electric. E. R. Carichoff
Engine. O. P. Underwood
Engine and gear casing. J. Carney
Engine cooling mechanism. Explosive. F. Reaugh
Engine vaporizer. Oil. D. R. Morrison
Engine wheel. Traction. D. T. Spry
Engines. Electric igniter for explosive. W. B. Hayden
Envelop. E. Ermold
Envelops. Machine for opening and removing the contents of. E. E. Wolf et al
Eraser holder. Ink or pencil. J. L. Nicholson et al
Exercising device. W. G. Ruhl
Explosive engine. C. W. Little
Eyeglasses. J. A. Schmid et al
Eyeglasses. F. S. Ward
Fan motor. F. Bockelman et al
Fastener. L. C. Kahl
Faucet. Disappearing. N. H. Piffard-Francis
Feather and producing same. Waterproofed ostrich. C. A. Potter
Feed water regulator. T. M. Wilkins
Feeder. Automatic poultry. 2 yats. J. Anderson
Feeder protection. L. Andrews
Fence. J. Weirick
Fence making machine. Wire. J. E. Fredrick
Fencing tie. Wire. O. S. Sturtevant
Fertilizer distributor. A. G. Cox
Fertilizer distributor. A. Fairly
Fiber vessel. J. J. Shea
Filter cloth. J. Crossley
Filter. Oil. reissue. C. A. Conn
Filtering stone. J. A. Davidson
Fire escape. W. G. Ragsdale
Firing gear controlling device. J. F. Meigs et al
Firing mechanism. J. F. Meigs et al
Flue cleaner. J. Macdonald
Flue stop. J. H. Nichols
Flue stopper. L. Russell
Forceps. Root extracting. N. D. Asdell
Fountain. J. A. Edmundson
Frame or the like supporting device. H. I. Poor
Fruit picker. G. O. Stansbury et al
Fruit picker. B. J. Downing
Furnace. S. F. Pierce
Furnace for the manufacture of steel. G. Gin
Furnace grate. J. N. Quinn
Furnaces. Apparatus for the combustion of oil in. H. Luckenbach
Fuse replacing device. H. G. Addie
Game apparatus. J. C. Cairus
Game or puzzle. C. W. Spicer
Gas. Apparatus for the manufacture of. C. H. Claudel
Gas. Capsule for holding compressed. S. H. Crocker
Gas generator. S. H. Hobart
Gas manufacturing apparatus. R. Dempster
Gas meters or other purposes. Coin freed mechanism for. W. Cowan
Gas purifier. J. B. Harris
Gate mechanism. E. A. Munn
Gate operating mechanism. J. K. Wheeler
Gear mechanism. Reversing. W. J. Wright
Gear. Transmission. C. H. Day
Geometrical instrument. S. E. Lona
Glove fastener. S. B. Lane
Glove former. G. J. Schneider
Gluing clamp. J. C. Keckweg
Gold separator. Pneumatic. W. Broadbent
Grain binder. W. C. Duryea
Grain separator attachment. J. Fernan
Grain spout. Air blast. C. G. Benedict et al
Grease trap. F. H. Paradise
Gun lock set trigger. D. Brown
Gun training device. VS. N. McClean
Hame. I. Larsen
Hame. R. G. Armstrong
Hasplock. J. Davy
Hat pounding and greasing machine. A. B. Waring
Headlight. F. Burger et al
Heat baffle and damper. Combined. L. P. Crosswell
High frequency apparatus. Protecting device for. L. De Forest
Hinge. J. E. Ahlvin
Hoist. T. E. Brown
Hoisting and conveying mechanism. G. W. Menefee
Hoisting apparatus. A. Sundh et al
Hoisting mechanism. S. Edling
Horseshoe. F. D. Palmer et al
Horseshoeing stand. S. M. Martin
Hose supporter. W. E. Bowen
Hot air drier. F. Richards
Hydraulic separator. Pneumatic. W. R. Grant
Hydrocarbon burner. L. E. Coleman
Hydrocarbon burner. B. C. Woodford
Hydrocarbon retort. G. W. Arper
Indexing device or card record system. A. L. Allin
Insulated joint. P. Holbrook
Insulated joint for railway rail sections. 2 pats. G. A. Weber
Insulated rail joint. 2 pats. G. A. Weber
Insulating compound. Heat. J. D. Scott
Insulating covering. Hair felt. H. J. Bellman
Insulator for vessel handles. Heat. E. D. Hooley
Invalid lifter and conveyer. O. B. Thompson
Iron. Dechromizing. O. Massenez
Ironing board. Adjustable. W. O. Bowman
Jack. I. Jefferson
Jar closure. C. H. Hess
Jar or can holder. A. B. Clark
Joinery. J. E. Ahlvin
Joint stiffener or clamp. J. B. Hunt
Journal bearing. I. Metzger
Journal bearing. M. F. Wiedemann
Labeling machine. Bottle. J. F. Schneider
Lace fastener. Shoe. H. Blankenstein
Lacing hook. W. H. Wood
Ladder. Step. C. R. Sheldon
Lamp and heater. Gas. W. S. McLewee
Lamp burner. H. W. Gander
Lamp. Electric arc. C. E. Harthan
Lamp. Electric arc. R. Scott
Lamp. Incandescent electric. J. R. Lovejoy
Lamp receptacle. A. A. Moffitt
Lamps. Manufacturing glowers, luminants, and filaments for electric incandescent. F. M. F. Cazin
Lantern safety case. H. F. Burchfield
Lathe attachment. A. Palm
Lathe tool holder. W. Bixby
Leather stretching machine clutch. E. L. Post
Leather used for making power belts. Machine for stretching. E. L. Post
Level. Spirit. J. Bishop
Lever. Ratchet. H. W. Koehler
Lighting and heating device. Vapor. F. W. De Tray
Lightning arrester. P. H. Thomas
Limb. Artificial. H. Weneberg, Jr
Lime or cement kiln. W. S. Speed
Liquid cooler coil support. M. J. Bernhard
Loading apparatus. Motor vehicle. G. H. Condict
Lock. J. Oleschak
Loom harness eveners. E. H. Ryan
Loom shuttle checking means. J. Northrop
Loom warp stop motion. Electrical. reissue. F. E. Kip
Lubricating device. J. F. Joy
Lubricator. J. H. B. Deuster et al
Lubricator. C. L. Houck et al
Lubricator. J. W. McClure
Mail bag catcher and deliverer. Automatic. M. R. Statham
Mail box. A. M. Burnham
Mail box. F. Schmoyer
Mask. A. Braverman
Mat. A. S. Burnell
Match safe and cigar cutter. Combined. A. Friedman
Matting. A. S. Burnell
Mattress. C. A. Fisher
Measuring stick. E. Newman
Measuring the speed of flowing liquids. Device for. R. Lohse
Mechanical movement. F. L. Eager
Medicine into eyes. Device for putting. G. A. Carpenter
Metal forging, shaping or punching press. J. Dodge
Mineral or ore washing jig. C. J. Hodge
Mining machine. Coal. J. F. Joy
Moistener. Envelop. E. Waid
Moistening pad. Finger. A. R. Hirt
Molding machine. F. W. Hudson
Mowing machine cutting apparatus. L. Study
Muffler. S. Hughes
Music board. J. Chisholm
Music leaf turner. C. F. Greiner
Music leaf turner. J. W. O'Neil
Music sheet feed controlling mechanism. J. H. Dickinson
Musical instruments. Automatic playing attachment for. T. P. Brown
Neckwear. Clasp for supporting scarfs for. L. Lassen
Nut cracking machine. S. M. Brown
Nut lock. H. L. Reynolds
Nut lock. J. Ball
Nut lock. A. Hayes
Nut. Lock. F. R. Allen et al
Oak lock. H. W. Wheeler
Oil burner. T. W. Hill
Oil burner. Fuel. F. Trowbridge
Oils from wood. Manufacturing pine. F. S. Clark et al
Oven. G. Kuebler
Package carrier. H. M. Weaver
Pages. Device for facilitating the turning of. J. Vickery
Paper holder and cutter. Roll. E. C. Lee
Paper moisture or grease proof. Making. I. Kitsee
Pasting machine. R. F. Pick
Pavement or roadway. F. J. Warren
Pavement or roadway. Street. F. J. Warren
Pavement or roadway. Street sheet. F. J. Warren
Pen. D. C. Van Valer
Pen. Fountain. F. W. Bender
Penholder. H. Purschke
Phonograph records or blanks. Manufacturing cylindrical. W. H. Miller et al
Phonograph repeating attachment. P. Weber
Photographic plate holder. J. Schaub
Pile and wharf supporting structure. H. C. Holmes
Ping pong or table tennis balls. Retriever for. F. H. Smith
Pipe coupling. J. J. Dossert
Pipe mold. O. Johnson
Pipe mold. L. Shell
Pitcher. Syrup. M. Bradford
Planer. M. Flather
Planing machine edging attachment. R. F. Brumbaugh
Planter. Corn. H. C. Badenhop et al
Planter. Potato. L. A. Aspinwall
Plow. Garden. J. T. Foulke
Polishing machine. H. A. Damerow
Popper. E. H. Barton
Power press. H. Osswald
Power transmission. V. S. Beam et al
Preserving citrus fruits. E. N. Alexandrian
Printer's block or base. H. B. Rouse
Printer's tie up. A. L. MacMaster
Printing machine. Hand. T. C. Finch
Printing machine inking mechanism. Flat bed. T. M. North
Printing presses. Adjusting wheel track for type beds of. G. P. Fenner
Printing with indanthrene. P. Jeanmaire et al
Pulley. H. W. Marsh
Pulp washer or condenser. H. G. Turner
Pump. C. B. Jones
Pump. C. A. Arnsberger
Pump. Air. J. H. Burkholder
Pump coupling. C. W. Decker
Pumping apparatus. D. R. Sheen
Punching bag supporting bracket. Aerial. J. O'Connor
Rail bond. W. E. Oakley
Rail bond. E. G. Thomas
Rail joint. G. A. Weber
Rail joint. M. D. Leebov
Rail joint. G. R. Wolfe
Rails. Attaching rail bond to. E. G. Thomas
Railway crossing. Automatic. G. A. Ritzler
Railway crossing signal. D. L. Hoover
Railway tie. S. S. Deemer
Railways. Sleet cutter and contact for electric. C. T. Leonard
Razor stopping device. J. W. Murphy
Recoil check and recuperator. Combined. J. F. Meigs et al
Register hook. H. B. Rouse
Rivet. D. G. Clark
Rivet or marking tag. L. J. Davis
Rotary engine. J. H. Putnam
Rotary engine. C. W. Akers
Rubber nipples. Spindle for forming. C. E. Longden
Rubber soled leather boot or shoe. G. F. Butterfield
Rubber soled shoe and welt therefor. G. F. Butterfield
Sanding device. C. B. Cooper
Saw blade. Cold metal. C. A. Juengst
Saw set. H. Rice
Sawmills. Off bear table for. E. M. Skantz
Scaffold. Painter's. G. R. Laughlin
Scale indicator. Antivibrating. M. A. Drquett
Scales, pressure gauges, &c. Tension device for. W. M. Fulton
Scoop. Egg. J. Scrimgeour, Jr
Screen. E. Hipolito
Seaming machine. Can. A. Wuff
Sewing machine. Buttonhole. D. Noble
Sewing machine. Glove. A. E. Lindner
Sewing machine oil shield. M. Merryman
Sharpening knives of veneer or other machines. W. H. Williams
Sheave. Ball bearing. C. A. Brinley
Shoe or furrow opener. C. E. Hoyer
Shoes. Returning machine for manufacturing. F. Feeney
Sifter. J. H. Kolkman
Sign, picture, &c. Changeable. F. E. Ives
Signal device. E. J. Atterbury
Signal apparatus. Wireless. 2 pats. L. De Forest
Size for paper making. Means for dissolving. B. Kniffler
Smoke preventing furnace. J. M. Erierson
Smoke protector. W. E. Andrew
Snap hook. W. D. Weir
Snatch block. A. Uren
Speed indicator. J. Heyde
Speed mechanism. Valuable. F. Miller
Spring washer or plate. S. C. Ball
Spring wheel. J. B. Kell
Springs. Bearing end for semielliptic. A. N. Lukens
Stairway or ladder. Counterbalanced. O. C. Fosselman
Steam boiler. J. J. Tonkin
Steam generator. J. N. Rice
Steam generator and steam superheater. Combined. J. Milne
Steering gear for ships. Auxiliary. E. C. Akers
Step joint. G. A. Weber
Stereopticon. J. W. Mead et al
Stereoscope. H. E. Richmond
Stereotype plate clamp. C. P. Cottrell
Stool. Folding. C. H. Mock
Stove. Gas. L. O. Watson
Stud. Balance spring. R. Lange
Sugar drawer attachment for bars. C. H. Bagley
Surgical appliance. P. Weaver
Suspenders. H. G. Macwilliam
Sweep rake. E. E. Blake
Swingletree. Safety. P. T. Christensen
Syringe. V. Pappenheim
Table lock. Extension. J. F. Arnold
Telephone call recorder. H. Abbott
Telephone exchange system and apparatus. Automatic. 2 pats. A. M. Bullard et al
Telephone exchanges. Call signal apparatus for. W. W. Dean
Telephone exchanges. Measured service system for. F. R. McBerly et al
Telephone meter. H. Abbott
Telephone receiver supporting means. F. W. St. John
Telephone toll line system. W. W. Dean
Telephone transmitter mouthpiece. I. S. Ashe
Telephones. Cut out for rural. R. E. Pedigo
Thermal motor. W. M. Fulton
Thill support. H. A. Post
Thill support. W. M. Nix
Thread or twine tension device. M. C. Ellison
Tire for vehicles. Combined rubber. R. Bell
Tire setting machine. Rubber. J. M. Sweet
Tire. Vehicle. J. A. Swinhart
Tires. Metal securing rim for elastic wheel. J. M. Sweet
Tobacco leaf sizing machine. H. Schumacher
Tooth. Artificial. G. C. Kusel
Towel ring. P. H. Germain
Toy. S. Jurado
Trap. J. Crawford
Trolley. H. B. Clarke
Trolley. P. Anderson
Trolley wire support. W. H. Spiller
Trolley wire system. Overhead. C. de Kando
Truck. Logging. A. H. Hancock
Truck. Warehouse. A. E. R. Blomquist
Truck wheel and bearing. G. F. Armstrong
Trunk. Wardrobe. M. N. Drucker
Tube cutter. J. J. Roush
Tube exchanger. G. Wiedeke
Tubes, &c. Machinery for making seamless metal. B. F. McTear
Tunnel construction. P. Kammerer
Turbine. A. M. Levin
Turbine governor. Hydraulic. L. Ribourt
Type casting machines. Matrix locating mechanism for. W. Ackerman
Typewriter. C. D. Rice
Typewriters. Blind attachment for. C. G. Chandler
Typewriting machine interchangeable key or button. A. Vokes
Umbrella runner. M. Gleason et al
Valve. J. C. McCarl
Valve. Bottle. R. B. Bailey
Valve. Dry pipe. J. H. Derby
Valve. Intercepting. A. A. Ball, Jr
Valve interlocking device. W. F. Cole
Valves. Adjustable retarding device for reciprocating. H. P. Thompson
Vehicle. 2 pats. J. A. Williams
Vehicle brake. O. F. Persson
Vehicle brake. L. House
Vehicle brake. Electric. A. Green et al
Vehicle. Dumping. R. B. Rifenberick
Vehicle. Motor. J. C. Thomas
Vehicle. Self propelled. H. Beckwith
Vending machine. W. L. Holloway
Vending machine. C. A. Disbrow
Vessel. A. Neilson
Vessels. Constructing containing. E. J. Winslow
Vibrator instrument. C. Owens
Vine cutter. F. M. Ewell
Voting machine. W. Glenn
Wagon. Dump. J. D. Olcott
Wall. Building. J. A. Ferguson
Washboard. C. L. Kinney
Watch guard. R. Marpert
Watch roller and hand remover. O. O. Anne
Water elevator. J. L. O. King
Water gate. F. E. Adams
Water heater. E. N. Longstreth
Wave transmitter. R. L. de Moura
Well drilling cable. A. C. Smith
Wheel rim. R. S. Bryant
Wheelbarrow. J. Ray
Whiffletree. J. Hair
Whiffletree hook. A. D. Tait
Windmill. T. O. Perry
Windmill lubricator. H. H. Tatsch
Window screen hanger. E. G. Rust
Window screen or awning holder. W. Y. Wolf
Window. Self closing. H. C. Smith
Wire fabric. Woven. C. A. Fisher
Wires. Die for tying intersecting. J. J. Morse
Wood boring apparatus. C. Kleinschmidt
Wood filling and cleaning composition. C. H. Humphrey
DESIGNS.
Aquarium. Fountain. F. Hundorf
Automobile body. D. P. Sammis
Badge. V. C. Barber et al
Bed spring. W. C. Grose
Bottle. F. Schilling
Brush holder. Tooth. A. Gent
Carpet sweeper casing and handle. E. E. Dryden
Clock case. 3 pats. G. H. Rhyndance
Caps. J. A. Moller, Jr
Lamps. Hood for incandescent electric. D. M. Gilbert

Mirrors, brushes, or similar articles. Back for H. Hillbom
Paper. Wall C. W. Williams
Plate or dish W. A. Pickard
Plate or plaque or similar article. G. E. Homer
Portiere M. M. Harding
Spoons, forks, or similar articles. Handle for H. Hillbom
Spoons, forks, or similar articles. Handle for 2 pats H. L. Wallace
Spoons, forks, or similar articles. Handle for W. A. Jameson
Statue H. P. Lewandowski
Stick pin L. Morgan
Stove or range B. J. Taylor
Vending machine casing H. G. Hensch
Water closet bowl 2 pats P. J. Madden

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MECHANICAL PATENTS

Accounting appliance. Credit W. M. Ellett et al
Aerated or carbonated liquids. Means for H. G. Watson
Air. Apparatus for separating dust from W. E. Allington
Air brake. Automatic W. E. Delancy
Air brake coupling. Automatic F. A. Shively
Air humidifying and cleansing apparatus J. W. Fries
Air moistening apparatus Q. N. Evans
Air tempering apparatus J. & W. Titus
Alarm D. N. Smith
Ammonium sulfate. Saturating apparatus for recovering K. Zimpell
Arc light distributor H. J. Palmer
Armature truck J. T. Hines
Atomizer G. F. Hawley
Bag or case handle J. S. Isidor
Baling press J. J. Day
Barrel boring machine A. H. M. Driver et al
Battery holder F. Jackson
Beet puller T. W. Palmer
Belt coupling M. F. Smithson
Bicycle frame. Motor E. Y. White
Bicycle handle bar support G. S. Tiffany
Billiard cue tip and fastener A. G. Brandt
Binder. File R. A. Oakley
Blast furnace A. Lattot et al
Block signal C. H. Morse et al
Block signal systems. Signal mechanism for J. Weatherby, Jr
Boat and propelling means therefor F. W. Smith
Boats from one body of water to another. Apparatus for transferring T. Thomson
Boiler systems. Controlling mechanism for flash H. Lemp
Bolt heading or upsetting machine attachment J. Skelton
Book holder C. S. Olcott
Bottle cleaning device W. W. Spalding
Bottle closure M. Elstrand
Bottle stopper T. Hogan et al
Bottle washer A. C. Ford et al
Bottles, jars, &c. Paper cap for milk H. S. Dennison
Bottles or the like. Drop stopper for M. Elstrand
Box making machine W. E. Schneider
Bracket stand for slot or other machines J. E. Packard
Braiding machine A. Siegrist
Brake apparatus. Fluid pressure M. Corrington
Brick veneering apparatus E. Rolfe
Bridge pier B. F. Hudson
Broom T. H. Brown
Brush handle D. G. Vaughan
Brush holding stopper for paint cans W. A. Sexton
Buggy side curtain B. S. D. Martin
Buggy top duster J. P. Shipman
Building block T. Podmore
Bung lock H. Jahn
Burial casket J. D. Ripson
Burlap bag T. G. Palmer
Button. Cuff E. F. H. Gaye
Button making machine A. Phelps
Cake mixing machine J. C. Gautier
Calculating machine M. Mayer
Calculator J. E. Duncan
Calipers J. J. Bornheimer
Candy pulling machine C. Thibodeau
Cane E. E. Ely
Car brake. Emergency W. M. Ryerson
Car coupling E. C. Washburn
Car dog for cable mine hauls. Automatic C. W. Damron
Car door retainer J. F. Lane
Car draft gear. Railway H. M. Pfleger
Car extension step. Railway E. Sirois
Car feeder W. T. Watson
Car hopper G. I. King
Car. Passenger J. O'Leary
Car. Railway O. W. Meissner
Car. Railway H. J. Bayard
Car. Railway passenger J. O'Leary
Car replacer H. H. Rippe
Car seat J. O'Leary
Car. Stock E. B. Gilleland
Car ventilator M. H. Hirschon
Cars. Apparatus for replacing derailed J. G. McNichols
Cars or other electrically propelled vehicles. Life guard for tram W. Simm
Cars. Saddle for tank A. Christianson
Carboy inclinator J. F. Flaherty
Carburetor A. C. Roebuck et al
Carburetor E. L. Dow
Carburetor. Gasoline engine J. A. McGee
Carding and cleaning machine. Wet moss M. C. Mollere
Carding machine lap feeding device C. Schofield et al
Carpet fastener J. D. Cox
Carriage top J. S. Draper
Cartridge loader E. E. Breckenridge
Caster F. F. Bischoff
Casting metals C. S. Szekely, Sr
Castings. Mold for making brass F. J. Friese et al
Cattle guard S. H. Summerscales
Cement A. Lamanna
Cement brick making machine O. Staley
Chain and wheel. Drive S. F. Clouser

Chuck G. R. Rich
Chuck. Lathe and drill O. M. Mowat
Cigar box W. Tisch et al
Cigar holder and vender C. M. Dodson
Clapboard marker E. B. Shepardson
Clay grinding pan D. F. Lepley
Clean out, backwater trap, and cellar drain. Combined F. Shay
Closing device. Automatic J. W. Watkins
Cloth, &c. Treating J. W. Yates
Clothes, &c. Rack for drying R. F. Miller
Clothes tongs C. O. Hollowell
Coating. Mold C. S. Szekely, Sr
Coffee or tea pot J. W. Chapman et al
Coffee pot D. H. Talbert
Collar. Split D. B. Snyder
Combustion of fuel. Promoting A. Timmis
Concentrator C. A. Smith
Concrete building block forming machine R. T. Frost
Concrete constructions. Adjustable mold for reinforced A. Bentley
Condensing apparatus C. W. Nagon
Conveyer O. Kling
Copy holder E. W. Edmonston
Cork extractor J. Kaiser
Counting device C. F. Pidgin
Coupling sleeve I. E. Palmer
Crank. Variable throw M. Barr
Cravat or necktie C. Groll
Curb and gutter former J. M. Williamson
Current motor. Alternating W. A. Layman
Current saving and spark reducing device for electromagnets G. H. Davis
Curtain pole J. J. Russell, Jr
Curtain pole fixture C. B. Wilkins
Curtain stretcher structure J. C. Whipple
Cyclorama. Moving spiral L. H. Martin
Dairy product cover O. Thibault
Dental draw press H. E. Reynolds
Derrick. Lifting H. C. Sr., & H. C. Stone, Jr
Discuss H. M. Holland et al
Display case or rack L. M. Siersdorfer
Display rack J. E. Roos
Door check R. W. Hubbard
Door opening device. Jail L. Mayer
Draft rigging. Reissue H. T. Krakau
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Harvester M. Patterson
Harves er. Corn B. N. Benjamin et al
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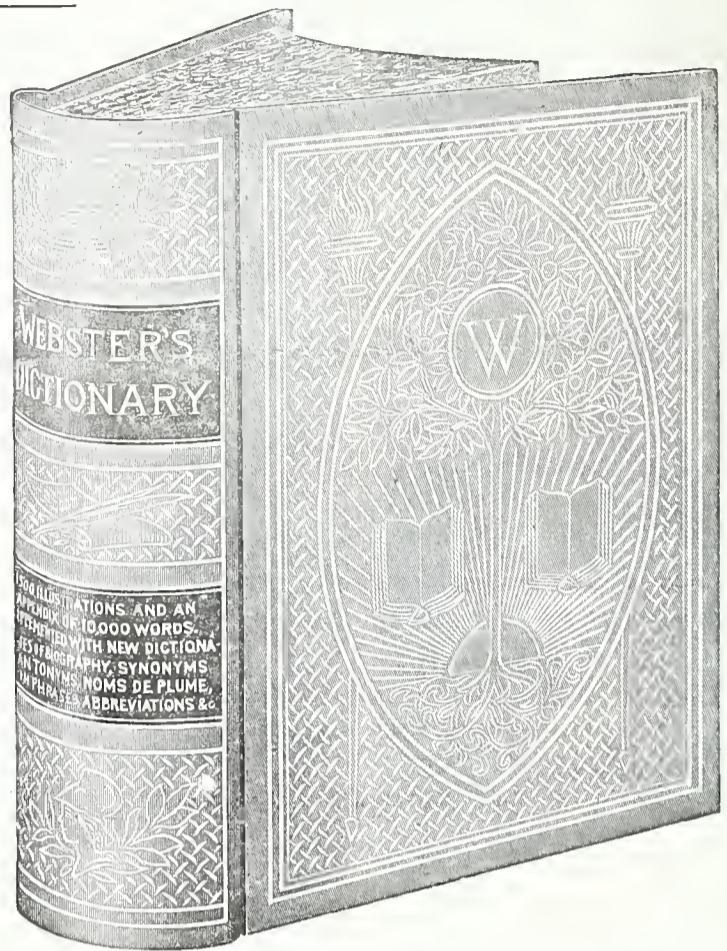
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WASHINGTON, D. C.—DECEMBER, 1904.

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THE NEW GOLD MINING.

ALTHOUGH the project of extracting the gold from the waters of the sea—where it is known to exist—has long been relegated to the limbo of impossibilities, the latest step in the progress of mining gold is through the medium of ships. Whole fleets of vessels, in fact, that sail on oceans of their own creating, are plowing wide channels through the fertile valleys of California and other Pacific Coast States. And it is to be noted that never has mining met with such success. This method, indeed, means the beginning of a revolution in the industry.

That it is possible to obtain, from land that has heretofore been considered fit only for raising vegetables, fortunes that rival those made in the palmy days of the Klondyke and Nome City, is a proposition that may well tax credulity. But although it is difficult to obtain information about the quantities of gold gathered, it is known to repay the investors a thousand fold. The ships are owned by corporations, and they do microscopic work on a huge scale, securing gold particles so small as to be invisible unless under the lens.

They are provided with apparatus that dig the seas they float upon; and over these bodies of water they pass, absorbing in their hungry maws every particle of treasure in the earth, working not only by the light of day, but, with the aid of powerful search-lights, at night as well, and bringing in upwards of a thousand dollars a day to their owners, from stubborn

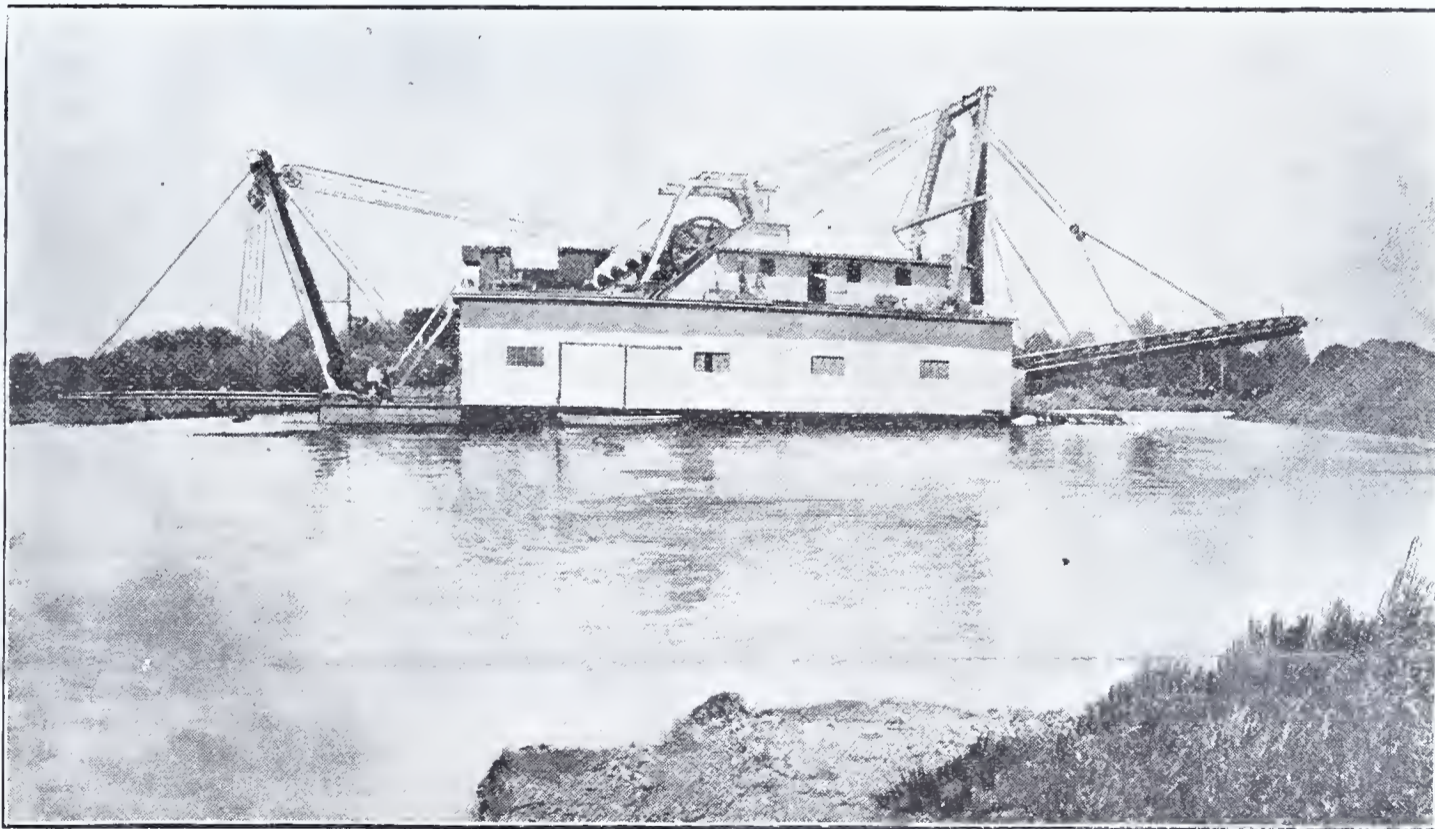
acres over which a few months ago, plowmen were plodding.

Gold has long been known to exist in minute quantities in the soil, especially in the valleys of rivers, and repeated efforts have been made to secure it: but the difficulties in the way were such as to make the expense greater than the probable yield would justify. The presence of seepage water, and of subterranean lakes and streams, baffled engineers. It was, as has been declared, like attempting to dig up the bottom of the sea.

tubes, and this, by forcing the water back, enabled the miners to work in the lower strata. Gold was found, but it was soon obvious that sufficient air pressure could not be maintained to permit the work to proceed properly. Water would rush back into the drifts at unexpected moments, menacing the life of the workers, and the plan had to be abandoned.

The secret of success of the gold ships is to utilize the forces of the enemy. Instead of trying to expel the water, they dig a lake bed, bank

ment, and are admitted to be the culminating achievement of mining genius. They carry hundreds of tons of machinery, and do the work of thousands of men. In appearance, they are remarkable. Take the ancient ark as it is popularly pictured, says a writer in one of our recent magazines, combine it with a river or estuary dredger, add a large section of a modern battleship, half a score of hoisting cranes, pile drivers, steam hammers, and battering rams, and some conception may be had of these vessels. In front extends a great steel ladder, like an inverted bowsprit. Up and down the ladder march in endless procession bucket shaped plows with mouths of forged manganese steel. The chain that carries them will support a weight of 500 tons. These keen edged plows will cut through solid rock, and they are driven with irresistible force by a marine engine. They delve into the banks ahead of the ship, literally eating up the land. Gorged with rock and sand, the buckets mount the ladder again, and along a huge gantry are carried back to a rotating cylindrical screen, into which they discharge



THE GOLD-SHIP AT WORK.

The dredges that were used were successful only in bringing up mud, and failed utterly to save the fine particles of gold. Huge pumps were also tried in vain. Another plan was to sink shafts into valleys, into which pneumatic tubes were driven. Radiating from the bottom of the tube were constructed drifts, and air under heavy pressure was forced into the

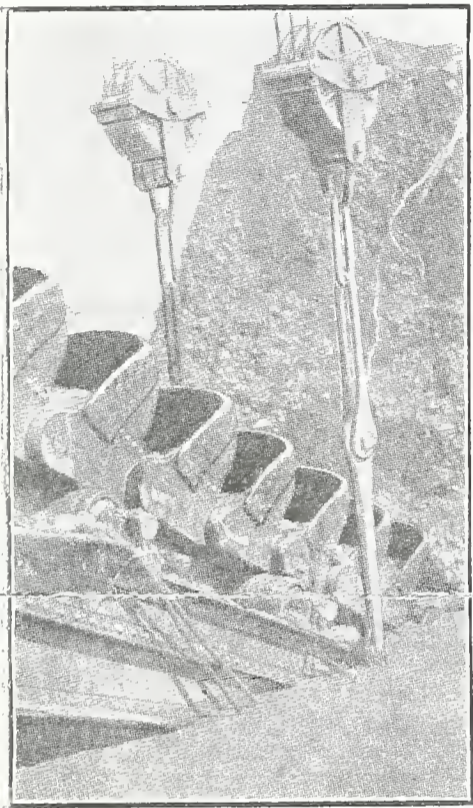
up the shores, and launch themselves on the water. If it is necessary, rivers are tapped and the water conveyed from a distance. It is employed, not only to keep the vessels afloat, but to wash the mineral, by an elaborate process, from the earth surrounding it.

These ships are the result of more than fifty years of trial and experi-

their contents at the rate of thirteen buckets a minute. Each one of these steel carriers contains 5 cubic feet of earth, so that an amount of material equal to the contents of three city dump carts is poured every minute of the day and night into the whirling cylinder.

Five thousand gallons of water are forced every minute into the revolving

mass. The screens make 20 revolutions per minute. All the principles of mining employed in pans, cradles, long toms, sluices, grizzlies and amalgam plates are combined in the winnowing process. Tables fitted with eccentric cams, to hold down coverings of cocoanut matting and expanded metal, catch the solid particles. Riffles containing mercury and amalgam plates are also used: but the cocoanut meshes are depended upon to catch most of the gold. These mats are frequently put through a process of washing in a tank, and the sediment that collects in the bottom is run through a centrifugal amalgamating machine. The amalgam is then heated, the quicksilver expelled, and the fine gold remains. All this is done by machinery.



THE CHAIN OF STEEL SCOOPS.

Everything too large to pass through the perforations in the rotating screen travels out of the end of the cylinder, and by a mechanical conveyer is carried to the refuse dump in the wake of the big ship. This mass of debris consists of stones varying from the size of a marble to that of a beer keg. All the soil collects at the bottom of the artificial sea in which the boat floats, and when the debris of rock is piled in the rear, the soil of course is buried far below the surface. Impalpable gold dust—so fine, in fact, that it will pass through chamois leather—is retained in the cocoanut meshes and riffles of mercury.

It is estimated that less than one-tenth of one per cent of the gold in the path of the craft escapes. Placer fields which had been worked over five and six times are now being harvested at great profit, so completely do these ships carry off the yellow metal. The ships can even secure paying quantities of gold from the discarded dumps of other mines.

Another remarkable thing about these vessels is the small force needed to operate them. Although three hundred tons of steel machinery are on one of these monsters, the whole is operated by two men. A solitary winchman, aloft in a sort of conning

tower, controls the entire mechanism. Levers, brakes and handles, working in quadrants, are all about him. Every part of the complicated vessel is under separate control, and all obey the direction of the winchman. Some of the boats are equipped with enormous steel legs, or spuds, which extend to the bottom of the lake, and enable the craft literally to stride from point to point in its advance. The movement of these legs of steel is in exact similitude to human locomotion. Each different part of the mechanism is run by its own induction motor, so that, while any department of the huge mechanical miner may be stopped for repairs, or for other purposes, the main work of the earth-consuming series of buckets goes steadily on. A single deck hand is the only other member of the crew, and his main business is to observe the electric pumps and to oil the machinery.

The buckets do the work of five thousand men and teams. Two million, five hundred thousand pounds of earth are lifted every minute by the monster. Thirty-five tons of rock and sand are constantly climbing the steel ladder. A motor of fifty horse-power drives them up and down. Sometimes they burrow to a depth of 50 feet; and on the water level—sometimes thirty or forty feet below the surrounding plain—these squadrons move on and on.

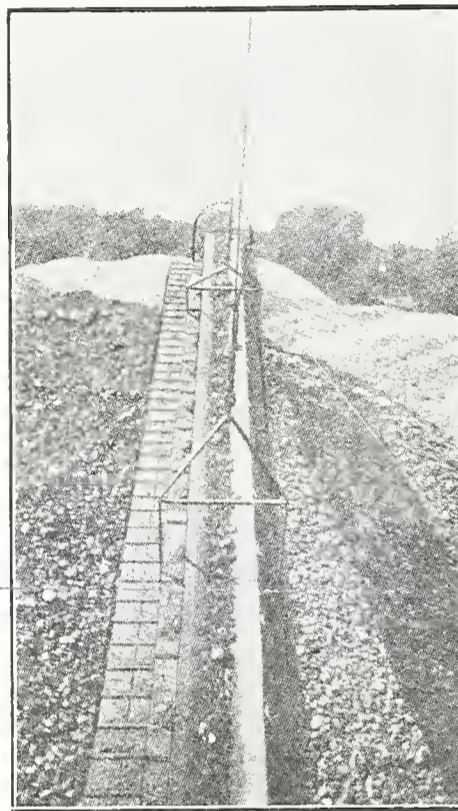
An extraordinary fact is that, in mining by this method, earth can be handled at a cost not over three or four cents a ton. The total expense per day in operating one of the mammoth vessels is sometimes less than \$30. The first cost of the craft is from \$50,000 to \$90,000, according to size: but within the first year the ship will pay for its own construction, will pay the cost of the land—even if the latter had been purchased at the high figure of \$5,000 per acre—will cover all expenses, including repairs and depreciation of machinery, and still will net the owner over \$100,000. These are figures of actual operations, and in regard to land that carries but a low proportion of gold. It is not strange that the corporations that own these fleets have no stock for sale, and that great effort has been made to keep the business as private as possible. Many of the investors are reaping a profit of more than 600 per cent on their investment. The industry, of course, is legitimate; but no get-rich-quick scheme can compare with it.

Each gold ship devours about an acre of earth every month. There are now over a hundred vessels in this unique fleet, so that the destruction of property can be easily estimated. In the wake of these squadrons is found only hopeless desolation. The soil on which cereals or fruits was growing is buried to a depth of thirty or more feet, and on top of it, in vast, irregular heaps, are tumbled acres of worthless rock.

It is a curious fact that in spite of the efforts of mining experts and engineers to solve the problem, the invention of these huge vessels is to be credited to two horticulturists. These

men were known among the best orchardists in California; their oranges and lemons had won prizes; their occupation was remunerative. But by accident, in digging a well, they found a quantity of gold dust, and further investigation showed that the trees of their orchards were growing in yellow sands. They bought up thousands of acres adjoining their farms, went quietly to work, and in the course of a few years devised these modern leviathans.

The wonderful results of the operations of the boats naturally turned attention from horticulture to mining. Some of the finest orchards of the Pacific Coast have been plowed up by the machinery and left waste land. One orchard, that was considered among the show places of the state of



GETTING RID OF THE REFUSE.

California, growing fancy varieties of grapes, figs, olives, etc., with an annual gross income of \$20,000 and a net profit of over \$100, the acre, has been sold to the gold corporations. The soil that nourished the trees so richly contains so much gold that the value of the land in the 80-acre vineyard, alone, was estimated at many millions. The trees have been cut down, the vines uprooted, and barren bed rock spread over the once prolific earth.

In another case, an orange orchard, covering 75 acres and representing an investment of \$24,000, with a satisfactory interest on a valuation of \$100,000, has been doomed. It takes five years to bring an orange orchard into bearing, and a mature acre of these trees is worth all the way from \$300 to \$2,000 the acre. But this is nothing compared with the mineral value of the land, which is calculated at no less than \$30,000 the acre. Needless to say, the owners of ground marked for exploitation can secure almost fabulous prices. In parts of the West, farm land that has been on the market at from \$20 to \$100 per acre, is now selling at \$5,000 per acre. Whole valleys, and even towns, are passing into the jaws of the gold monsters.

The same conditions are found in

Idaho, Colorado, and Montana. The fleets are about to invade Alaska, where the seepage of the Yukon valley and the snow-soaked tundras of other sections, instead of offering an obstacle, will facilitate the progress of the ships. New Zealand also possesses her cruisers, and they are to be tried in China, and, when the war between Japan and Russia comes to an end, in Siberia. Americans are now in the East, making tests and arranging for government concessions.

One result of this widespread activity will be an almost incalculable addition to the world's supply of gold. It is not likely that at any time in the near future, will the amount of this precious metal become so limited as to threaten financial equilibrium. Instead, we may live to see its value depreciated by the very excess of the supply. It is stated that since America was discovered, the total amount of yellow metal produced in the world has been less than \$11,000,000,000, and nine-tenths of that quantity has come from placer mining. Until the present, placer methods have merely scratched the surface of the real gold deposits. It is said that the gold ships already in use are now adding \$36,000,000 every twelve months to the hoard of the world. If earth where the deposits of gold do not exceed twelve cents to the yard can be worked at a profit, it can be imagined what the returns are for sections where it is found in amounts valued at no less than \$5 per yard. In parts of Idaho, for instance, a day's work yields a return of from \$10,000 to \$15,000.

With the increased number of argonauts who will crowd to this new branch of industry, the yield in the coming decade will probably astonish mankind.

The Telautograph in Railroad Service.

According to "The Railroad Gazette," Gray's telautograph, a telegraph instrument which records a message at the receiving end in the handwriting of the sender, is now in use at the Union Station, at St. Louis, for announcing at various points in the station the prospective arrival of trains.

The sending operator is in the signal tower at the entrance to the station yard, and he writes his message announcing each train as soon as the train comes within sight; and as all trains run past the tower and are backed in, this gives the men in the station about five minutes advance notice. During the busy hours of the morning and evening, the sending operator keeps his line at work almost continuously.

There are receiving instruments in the station master's office, the baggage room, the information bureau, and a number of other places at which prompt information concerning incoming trains is desirable. For each train the number of the track on which it will come in is given in the message.

The advantage of this method of communication over the telegraph is in the fact that no operator is necessary at the receiving end; and, as compared with the telephone, there is also the advantage of accuracy, the person at the receiving end not giving any particular attention to the apparatus. With a sending operator who writes a clear, legible hand, the apparatus assures clear and legible bulletins at all the receiving stations.

The sending operator has a receiving apparatus connected to the line in his own office so that he always sees the record of what he is sending. Any intelligent person who can write can send the messages, and the receiving instrument is self-registering, so that there is no delay if the person at that end is absent from his office.—*The Electrical Age.*

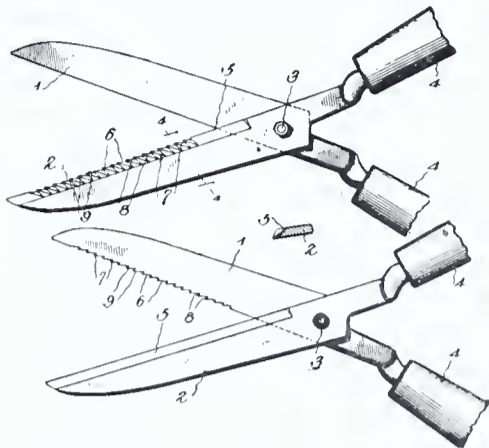
CLEVER NEW PATENTS.

Screw Driver.—Non-Slipping, Self-Sharpening Shears.—Safety Clutch for Elevators.—Combination Garden Tool.—New Air-Pump.

Screw Driver.

A new device for use in connection with a screw-driver for holding screws while being driven, has been patented by Mr. Charles Lusted, Sr., Lafayette, La. The device has distinct advantages because it will securely hold the screw until the same is driven nearly home, and then can be quickly released so that the driver can be automatically engaged directly with the screw. The device comprises a head 12, that is provided with a longitudinal bore and a lateral recess communicating with the bore. The lower end of the head is provided with spaced screw-embracing jaws, adapted

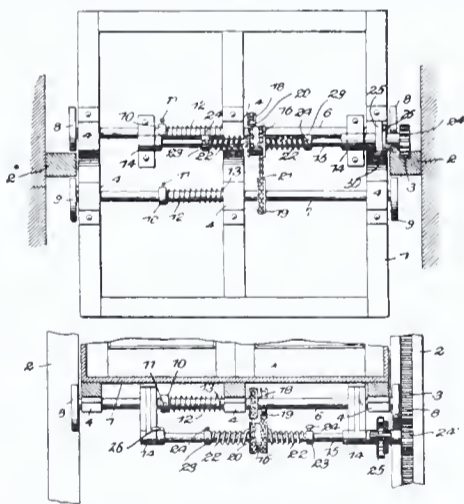
cutting edge provided throughout a portion of its length with forwardly inclined sharp cutting teeth 7, each tooth having its forward edge disposed substantially at right angles to the edge of the blade as a whole.



This serrated cutting edge prevents the slipping of the material to be cut along the blade, while the teeth of one act upon the other somewhat in the manner of a file, the smooth blade, also acting against the teeth of the serrated blade, so that the cutting edges are kept sharpened.

Safety Clutch for Elevators.

Francis Blanding, of Brockton, Mass., has secured a patent on a safety device for elevators, which is in the nature of an improvement upon mechanism of a similar nature patented by him in 1898. The safety device described in the first patent was found, when subjected to the test of commercial usage, to be defective in a respect that made it of little value for the purpose for which it was intended. He employed gripper shafts and an actuating shaft, together with a flexible connection between the same so that, should the elevator car fall freely, the shafts would be turned to grip the guides and thus hold the car. It was found, however, that when ropes, leather straps, or chains were used to connect the gripper-shafts with the actuating shaft, the



sudden strain placed upon the connections in the operation of the device to stop the elevator car when falling freely after the breakage of a cable frequently caused the connections to break, thus rendering the device useless for the purpose for which it was intended. Increasing the size and strength of the connections did not prove a satisfactory means of correcting this defect.

The object of the present invention is to completely avoid the defect described, and the objection is overcome by the following simple mechanism. A pair of gripper shafts 6, and 7, are employed to which gripper cams 8, and 9, are rigidly connected, which cams are arranged to engage the opposite sides of the guides 2. Springs 12, are associated with the gripper shafts to hold the cams normally in inoperative position, and disks 18 and 19, are also rigidly secured to the gripper shafts. An actuating shaft 15, having a pinion 24

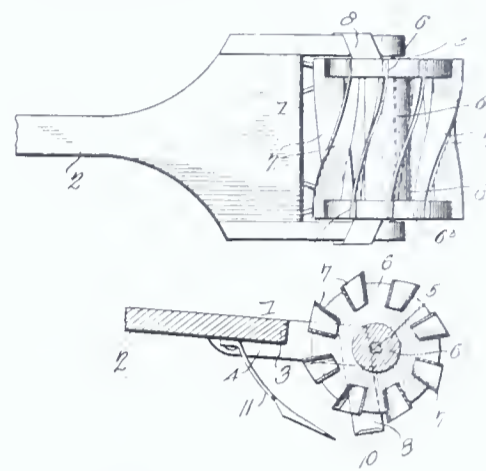
meshing with a rack along one side of the elevator shaft, has a disk 16, loosely journaled thereon, while spiral springs 22, coiled on the actuating shaft on opposite sides of the disk, each have one end attached to such disk, their other ends being secured to set collars. Flexible connections are employed between the disk on the actuating shaft and the disks on the gripper shafts, so that the latter will be operated from the former, while a yielding connection is secured between the cams and the actuating shaft.

To provide means for positively preventing the engagement of cams 8 and 9, with the side rails 2, during the ascent of the elevator-car, the dog 26, is rigidly mounted upon the actuating-shaft 15, near one end thereof, and is adapted to contact with one of the shaft-hangers 14, to prevent rotation of the actuating-shaft in the direction in which it would be caused to rotate by the upward movement of the elevator-car if the dog 15, or equivalent means for preventing such rotation were omitted.

Combination Garden Tool.

A novel agricultural implement has been devised by Clarence I. J. Barker, of David City, Nebraska. The implement, besides acting in the nature of a cultivator, is also intended for killing and exterminating weeds. It is especially adapted for beet, onion and garden cultivation, though obviously it may be used for other analogous purposes. The device comprises, in addition to a frame of suitable construction, a reel journaled in the frame and having a plurality of obliquely disposed knives or cutters. A flat stationary knife is permanently connected with the frame and forms a yoke. One or more of the cultivator blades may be suitably attached to,

and connected with, the under side of the frame in rear of the reel. The entire tool may be made in various sizes, either adapted to be drawn by a draft animal, when used in the field, or to be pushed by hand when used for garden cultivation, the general characteristics of the device being in all cases preserved. When the device in operation is pushed over the ground by means of the handle 2, the edge of the cutter 10 will engage the soil and cut under the surface of the latter. The obliquely-disposed blades 7 of the reel will engage the



stumps or stalks of the plants on the surface, and will perform the double function of cutting or chopping the latter and also of so holding them and forcing them against the cutting edge of the blade 10, as the latter progresses under the soil, as to cause the said blade inevitably to sever the roots, thereby killing the plants.

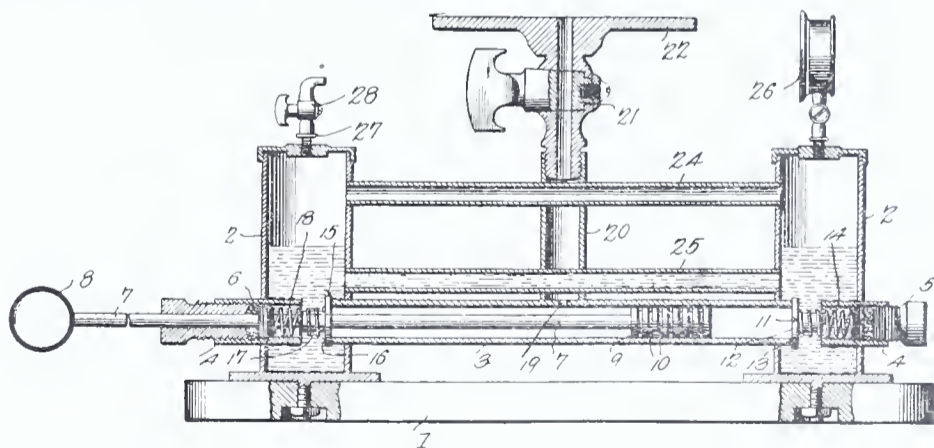
The construction of the device is extremely simple, and it may be produced at a trifling expense. Whether used as a garden-tool, or on a larger scale for cultivating in the fields, it will perform the duties required of it in a simple and perfect manner.

New Air-Pump.

A novelty in the way of air-pumps has been devised by Mr. Justin S. Hemenway, of Riverfalls, Wis., the principal object of the invention being to provide a pump of durable construction by means of which an almost perfect vacuum may be readily produced, and which may also be employed as an air compressor.

Another object of the invention is to produce an air-pump in which no valve need be opened to permit the

spring-pressed valves 12, 15. An air inlet 19, to the cylinder is provided between its ends and extends from a supporting plate on which any article, from which air is to be exhausted, is placed. One of the oil receptacles is provided at its upper end with an air outlet cock 28, while the other has a pressure gage 26. A reciprocating piston 9, is mounted in the cylinder and is movable to positions on opposite sides of the air inlet, this piston being operated by a rod 7, projecting through one of the receptacles. Oil is supplied to the receptacles and

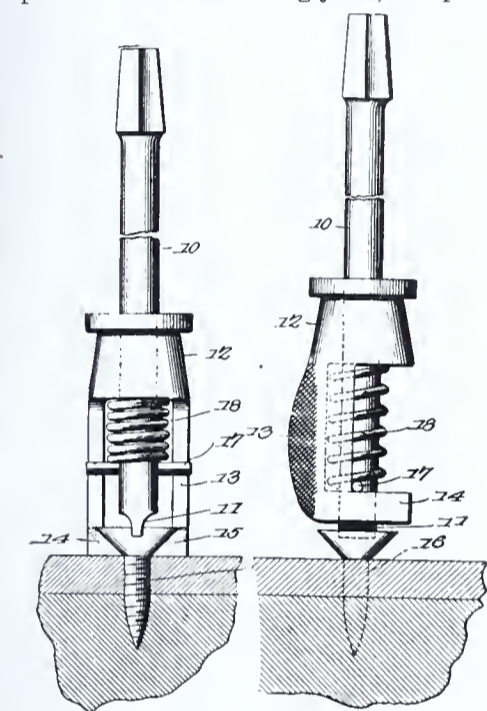


passage of air from the receiver or bell into the cylinder.

A further object of the invention is provide in an air-pump, an improved form of valve at the end of each cylinder and a liquid seal in connection with the valves to prevent the return of air to the cylinder after having once been forced out.

In the structure shown, a horizontally disposed open-ended cylinder 3 is employed, the ends being connected to, and communicating with upright oil receptacles 2, which receptacles have separate oil and air connections. The connections between the ends of the cylinder and the receptacles are controlled by outwardly opening

partially fills the same, extending above the cylinder and above the lower connections. If air is to be exhausted from any article, such article is placed upon the plate 22, having the air inlet, and the piston is then rapidly reciprocated. Air is thus drawn through the inlet into the cylinder, and from such article is expelled past the valves through the oil, finally escaping from the outlet cock. On the other hand, if air is to be compressed, the receptacle for the same is connected with the outlet cock, and the piston reciprocated in the same manner, whereupon, air drawn therein through the inlet, will be expelled through the cock into such receptacle.



to partially surround the head of the screw. A screw driver is mounted in the bore and carries a transverse pin 17, that bears against the vertical walls of the recess, thereby operating to hold the reduced point of the screw driver in alignment with the opposed faces of the jaw. A screw mounted upon the screw driver bears at its upper end upon the top wall of the recess and at its lower end against the pin, thus operating to project the reduced end of the screw driver between the jaws when the head has been released from the screw, in order to effect the complete driving of such screw.

Non-Slipping, Self-Sharpening Shears.

In shears, particularly those employed for pruning purposes and for cutting heavy material, great difficulty has heretofore been experienced in preventing the blade slipping on such material. This objection has now been overcome by means of certain improvements invented and patented by Mr. George E. Benton, of East Hampton, N. Y., who has devised shears that not only will not slip, but will be also self-sharpening. Mr. Benton states that, while his invention relates particularly to shears for use in hedging and pruning, the same may also be applied to shears for cutting cloth, paper, leather, and other material. As shown in the accompanying illustration, the blades 1, and 2, are pivoted together in the ordinary fashion, and have substantially flat co-operating faces. One of these blades has a smooth beveled cutting edge 5, while the other has a beveled

THE DEMAND FOR WATER POWER.

How Waterfalls Enable the World, While Increasing Its Machinery, to Spare Its Coal Supplies.

Every day sees more and more of the wasted power of waterfalls, which lies at man's disposal in every hilly or mountainous country, turned to use in furnishing electric energy. The power of waterfalls is driving the greatest of all tunnels, the double Simplon bore, through the Alps: it is sending another tunnel, by devious ways, behind precipices and under glaciers to the summit of the snowy Jungfrau: and a plan is now being perfected for constructing, once more with the aid of waterfalls, and to be run by them, when finished, a rival to the Simplon road, which shall cross the Alps between Turin and Martigny.

Everybody knows what Niagara is doing, and how the waterfalls of California, and of other mountainous States, are being harnessed.

A. A. Campbell Swinton, at the recent meeting of the British Association for the Advancement of Science, presented accurate statistics, which he had personally collected, showing that no less than one million, five hundred thousand horse-power derived from waterfalls is now being utilized in various parts of the world for the development of electric energy. Of this great total, which he believed did not represent the full truth, for he thought it probable that the real aggregate is two million horse-power, nearly one-third must be credited to the United States.

There is one feature of this utilization of water power in place of steam power, which Mr. Swinton brought out, and which is seldom thought of, and that is the saving of coal which it effects. On the basis of two million horse-power derived from waterfalls, this saving amounts to nearly twelve million tons of coal per year.

But the maximum amount of water-power that is available has not yet begun to be approached in actual utilization, so that the annual saving of coal must become larger and larger every year. This, in view of the increasing difficulty of working many coal mines, owing to the great depths to which they have penetrated, and in view of the approaching exhaustion of some of the most famous fields, becomes a highly important consideration. Every little while the world is reminded, more or less sensationally, of a coming coal famine. The fact is that coal, of the better grades, possesses so many advantages and conveniences as a fuel that the earth's supplies of it should be conserved for human use as long as possible. Men of science have more than once sounded a warning against the waste of coal, for coal is the gift of a geologic age which can not be renewed. Thus waterfalls, by enabling us to spare coal, are performing an indirect service only less important than their direct service in supplying electric power. But for them the growing use of electricity would soon make a drain upon the coal mines of the most serious character.

The era of waterfalls seems certainly to have dawned. Every great cataract will become a focus of industry, just as every great river valley has always been a center of population, and Professor Brigham's prediction, that Niagara is to be the industrial center of America, may be fulfilled within a generation.—*Success*.

THE NEW AUSTRALIAN PATENT LAW.

By JAMES HAMILTON, M. E., LL. B.

LEFT to what is practically self-government on their island continent, our Australian cousins have solved problems in a way which has elicited approval from the foremost nations—approval which has in many cases found expression in adoption. The Australian law governing the election of public officers has proved a model after which have been fashioned the election laws of nearly all countries, and advocates of the Australian method of settling labor disputes are to be found among the foremost thinkers in the industrial world. A new Australian law on a subject of such widespread industrial interest as that of patents for inventions naturally engages attention, and in what follows, a comparison of this new law with those of the patent laws of this and other leading commercial nations, will be made.

Comity between nations has found expression in the provision that "any person, whether a British subject or not, may make an application for a patent." In this lack of distinction between subject and alien, Australia has followed the laws of all the principal patent-granting countries. It is to be noted, however, that not until the statute of March 3, 1903, amending our law regarding the filing of caveats, did an alien have in this country all the rights of a citizen, although since 1836 an alien has had equal right with a citizen to file an application for, and obtain, a mechanical patent.

The right to make application for an Australian patent must be obtained from the actual inventor in those cases in which he himself is not the applicant. Here is a departure from the British law which has been criticised unfavorably for its permitting the grant of a valid patent to a thief who has stolen the invention from a foreign country. During the revival of learning following the Dark Ages, England was far behind the leading Continental countries, because of her insular position; and in order to promote knowledge and progress of the useful arts, the Saxon kings rewarded those who made the then perilous journey to the Continent and brought back to the realm knowledge of some new and useful manner of manufacture. The usual form of this reward was that of a patent giving the recipient the exclusive right for a period of years to practice the invention or carry on the method of manufacture thus imported. Though the reason for the rule has disappeared with the advent of the arts of printing and telegraphy and the facilities of travel, patents granted the communicatee of one not the actual inventor are sustained, even though the communicator may have stolen the invention.

A much more rigid rule is established in this country, where the applicant must not only be the actual inventor, but must also establish a "prima facie" right to the grant by making an affidavit in prescribed form. He only it is who may sign the papers, while in Australia anyone claiming under him may sign them. In nearly all the important countries of Continental Europe, anyone claiming under the actual inventor may make application in his own name, and in most cases without giving any proof of his right. Like our own law, the Australian law is careful to protect the rights of representatives of deceased inventors and of those who, through insanity or the or disability, are unable to make required declarations.

As to what may be the subject matter of letters patent, the new Commonwealth's law servilely follows the British law, saying that "invention means any manner of new manufacture, the subject of letters patent and grant of privilege within section 6 of the Statute of Monopolies" (21 James I., c. 3). It may be that through judicial interpretation the term "manner of new manufacture" has come to have a definite meaning; but one cannot help entertaining a feeling of uncertainty about a term under which patent rights were for nearly two centuries denied to processes, until Chief Justice Lyre, in passing upon Watt's invention, embodied in the steam engine, stretched by what may be called judicial statesmanship the meaning of the term to include the method of doing a thing, a mode of treatment, a process.

Under the comprehensive enumeration in our statute, "art, machine, manufacture or composition of matter" (copied in the Canadian law), little question has arisen or can arise as to what is of a patentable nature. However, disregarding exceptions expressly made, as military inventions in Russia, medicines in nearly all the countries of Continental Europe (although several grant patents for processes of manufacturing medicines), foods and chemical products in several European countries, the subject matter of patents does not differ greatly under the laws of the several countries. It must be new, useful, involving the exercise of ingenuity in its production and susceptible of being exploited industrially.

The degree of ingenuity required to be shown varies much, however, in the practical administration of the law. Thus our Patent Office is more liberal than the German Patent Office in attributing invention to a given change. So, also, novelty is determined by rules somewhat artificial. Thus, under the Australian law, proof that the invention was known over fifty years ago, but not used in Australia within that period, will not destroy the quality of novelty under the new law. In Hungary the period is one hundred years, while in this country no time is prescribed. The granting of a patent in any foreign country before filing an application in Australia destroys the quality of mere novelty: a year from the issue of the patent is allowed in Canada: the grant of a foreign patent for the same invention has no effect in this country, provided the application is lodged here within one year from the date of filing the foreign application; while Australia follows the British law and requires a sufficient description of the invention to be published in Australia, as a printed copy of the specification and drawings, or, in some cases, a copy of our "Patent Office Gazette."

The new Australian law requires an examination to be made into the novelty of the alleged invention before the grant of a patent. The scope of the search will be a matter of administration of the Patent Office, for the statute itself is far from clear upon this point. Among other things, the examiner is required to ascertain and report as to whether the invention for which a patent is asked is already patented in the Commonwealth or in any of its component States, or described in any prior application filed therein, and to "report as to whether, to the best of his knowledge, the invention is or is not novel." It would seem from this that something more is required than a search limited to Australian patents and applications, unless, indeed, the examiner is to depend upon his individual knowledge of the art.

But since the grant of the patent

may be opposed by any person on the ground "that the invention has been described in a book or other printed publication published in the Commonwealth before the date of the application, or is otherwise in the possession of the public," the examiner's search, may, perhaps, include printed copies of patents, publications of foreign Patent Offices and the literature of the art. In any case the requirement that a search be made is a departure from the practice under the laws of the several Australian States, which were satisfied by an examination touching matters of form—that is, as to whether the title had been stated, the invention described and the application and specification drawn as prescribed—without going into the merits, and passing upon the patentable novelty of the invention.

In this country a rigid search is made by the examiner, the scope of which includes all patents, domestic and foreign, books, periodicals, trade journals and the like, irrespective of the language. Moreover, the examiner passes upon the question of invention and of utility, and may reject because, within his knowledge, the invention is in public use. Searches of a scope equal to that required by our practice are made in Germany, Austria, Denmark and a few other countries. Great Britain recently passed a law providing for the examination as to novelty of applications, breaking away from the old system which required no more rigid examination than was required by the practice in the several Australian States, and which, therefore, left it to the courts to pass upon the question, when controverted, as to whether the invention was patentable. This is the policy adopted under the recent change in the French law. In Belgium, Spain and Italy not even this examination into matters of form is made, the system pursued in these countries being analogous to our registration of title deeds and the like.

As a patent under any system—such as registration, examination as to form only, or examination as to both form and merit, entailing a search—is only a right to sue, it has been contended that a patent should be granted in every case, leaving to the determination of the suit the right to the patent: and that to force the applicant to overcome the objections raised by the Patent Office authorities before he can obtain his patent, and again to establish his case before the courts, is to require that he go over the same ground twice. It is pointed out also that in this country under the search system, the courts, while holding that proof of the grant makes a "prima facie" case as to validity, refuse to grant a preliminary injunction in a suit for infringement upon bare proof of title and infringement, and require, therefore, higher degree of proof as to validity than that coming from the grant.

The requirement as to search in the new Commonwealth's law is undoubtedly a step in the right direction, and is in keeping with the change in the law of the mother country and with the practice in the leading industrial countries. Patents granted under the search system are entitled to respect; they are issued only after a careful inquiry into the state of the art by an expert in that art; and the public is reasonably sure that an article properly marked "Patented," embodies an invention entitled to the protection of the courts. The patentee, on one side, is made aware of prior work in the same field of invention and of the limitations imposed upon his claims thereby, and so is not deceived into the assertion and attempted maintenance of rights to which he has no title.

In short, a search inspires confidence in the public that it is not being robbed of its rights, and that the patentee is entitled to his reward, confidence in the patentee that he and those claiming under him may invest

time, money and effort in bringing the invention to public notice without fear of successful imitation after its establishment in public favor, and confidence in the courts that some substantial addition to the world's knowledge must have been made before the strong arm of the law can be invoked in the protection of patent rights.

It has been urged against the search system that it is responsible for the suppression of many meritorious inventions to which illiberal examiners have denied patent protection, whereby the progress of science and of the useful arts has been impeded. In Australia, an appeal is made to the law officer on questions of form, and to the High Court, or Supreme Court on questions relating to merits. In this country an appeal is made on questions relating to merits first, to a board composed of three examiners-in-chief; second, to the Commissioner in person; and third, to the Court of Appeals of the District of Columbia. To safeguard still further the rights of an applicant, the Australian law provides that the Commissioner may, if he believes good ground exists for refusing to accept a specification without condition, accept it on condition that a reference to such prior specification as he thinks fit be made thereon by way of notice to the public.

This idea is not new with the Australian legislators, for it was advocated by Llewellyn Deane, Esq., of Washington, over thirty years ago; yet it is the first time such a provision has been embodied in law. After the grant of a United States patent, all papers filed by the applicant during the progress of his application, and all Patent Office letters and actions are open to public inspection, so that information may be obtained at small cost as to what references were cited by the Patent Office. To amendments made by the applicant in response to objections from the examiner in relation to matter of substance, the courts in this country have wisely attached great importance in determining the scope of the claims, and have uniformly held that where an applicant has by amendment narrowed his claim in order to procure his patent, he is restricted to the claim as allowed and estopped from asking an interpretation thereof so broad as to exclude the limitation imposed by amendment.

It would aid greatly in the interpretation of claims if our Patent Office would print at the end of every specification a list of the references cited and the claims canceled or modified in view thereof. It seems a step backward to provide, as is done in section 51, of the Australian law, that reports of examiners shall not be published (except, of course, to the applicant) or be open to public inspection, or be liable to be inspected or produced in any legal proceeding, unless the court or person having power to order inspection or production certifies that such inspection or production is desirable in the interests of justice and ought to be allowed. No good reason appears why the public ought not to be given every facility in determining what has been withdrawn by the patent from unrestricted public use.

After the acceptance of the complete specification in Australia, the application and its accompanying specification is laid open for public inspection for three months, within which period any person may oppose the grant upon any of several enumerated grounds, among which are: that the invention is old in that it has already been patented in the Commonwealth, or one of its States, or described in a printed publication or is otherwise in the possession of the public before the date of application; that the opponent has filed, prior to its disclosure by the applicant in the complete specification, an application for the invention, not disclosed in the provisional specification; that the applicant has no legal right to apply, and so on. The parties are heard by the Commissioner, with

appeal to the courts from his decision.

This procedure is unknown to our laws or those of Canada, but has long been in vogue in Great Britain, Germany, Austria, Denmark and the several States of the Australian Commonwealth. In this country we depend upon the oath of the applicant to establish his status as the true inventor, and upon the search of the examiner to ascertain the state of the art. The United States examiner takes cognizance of interfering applications and institutes interference proceedings to determine priority of invention between the interferants. If a careful search be made by the examiner, little is left to be developed by an opposition, except the matter of a prior public user. Evidence offered to support such user has always been scrutinized carefully by the courts here, and proof beyond a reasonable doubt of such user has been always required.

The facts regarding the user rest in "the slippery memory of man": honest men may be easily mistaken as to what they saw years before, and interested parties are not lacking in the art of persuading witnesses at such times. It is easy to foresee the abuse to which such opposition would be put in this country by large corporations if it were permitted. Skillful counsel and plenty of money for litigation would enable them to harass an applicant until they could buy in the invention at their own figure. The interest of the public and of inventors is served by keeping the application secret and "ex parte" until it matures into a patent, and relying upon our examining corps of scientific experts to guard the public interests.

In this country there is no limit upon the time during which an inventor may publicly experiment with his invention before he applies for a patent, provided he is diligent and the use is not made with a view of deriving profit, but merely with a view of perfecting the invention—a "bona fide" experimental use. In Australia, however, the applicant is limited to one year prior to the lodging of his application. In this country an inventor may have his invention in public use or on sale or described in a printed publication for a period not exceeding two years without forfeiting his right to a patent therefor: but the Australians have adhered to the illiberal British rule and denied the inventor the right of making public his invention (except by way of test or exhibition, public or private) before filing his application.

After the grant of the patent, the Australian law requires the patentee to work his patent—commercially exploit his invention—within two years to such an extent as to satisfy the reasonable requirements of the public, or to grant licenses on reasonable terms to others, under penalty of revocation of the patent. In this policy Australia follows the mother country, and the requirements seem to be as light as possible while making any provision whatever as to working. All the European countries make some requirement as to working a patent granted by them: but whenever a change is made in the law upon this subject it is generally to make the requirement less burdensome by the extension of time, acceptance of good reasons for default, or granting compulsory licenses.

Even Canada has recently admitted certain classes of inventions to compulsory license privileges. In this country no working is required, and the patentee's self-interest is relied upon to make him put his invention into public use. This seems to work well, and our industries certainly thrive without any legal compulsion as to working patents. But it would be better if every court adopted the doctrine laid down by some of our courts to the effect that patents not put into early and continued use, but which have lain dormant for years—mere "paper" patents, as they have been called—shall not be entitled to a

construction not contemplated on their face, but shall be limited to what is shown.

In this country an inventor desiring to obtain official record of his disclosure of an invention not yet in perfected form, may file a "caveat," which entitles him to be notified of any application filed within one year thereafter and claiming substantially his invention. Because the law allows him two years within which to put his invention in public use or on sale, few caveats are filed. Australia follows the law in force in her several States and in the mother country, and allows the inventor to file a provisional application, which must be followed by a complete specification within nine months, which may be extended to ten months. A provisional specification need only "fairly" describe the nature of the invention: but a "complete specification must fully describe and ascertain the invention, and the manner in which it is to be performed, and must end with a distinct statement of the invention claimed."

In short, the complete specification corresponds to the specification which is required with our application for a patent, while the disclosure made in the provisional specification resembles that made in our caveats, and is more general. But the filing of a provisional specification is the beginning of an application for a patent, while the filing of a caveat here has no such effect. The number of claims permissible in an Australian complete specification is not limited, and the invalidity of one or more claims does not affect the validity of the remaining claims. In this the Australians have shown their sense in thus breaking away from the British rule of to-day, by which the invalidity of one claim invalidates the whole patent—a rule established by the early English judges at a time when monopolies of any kind were "odious."

The term for which an Australian patent is granted is, like that of a British patent, fourteen years. Most of the European countries grant their patents for fifteen years, and require the payment of a yearly tax to keep it in force. In this country the term is seventeen years without the payment of any tax. Australia seems to have "straddled" the tax question, and requires the payment of a renewal fee of five pounds sterling (\$25) at the middle of the term, closely following Canada, who divides her term of eighteen years into three equal periods, with a fee of \$20 at the beginning of each period. Some reason might be for the requirement of a renewal fee in Australia, if the first fee were small: but it costs \$40 in government fees alone in Australia for seven years' patent protection, as

against \$35 for seventeen years' protection in this country.

Under the new law, Australia grants additional patents to patentees for improvements upon the invention set out in the original or parent patent. These additional patents are granted upon the payment of one-half of the fees prescribed for the parent patent and expire therewith. This is an innovation as regards Australia, but additional patents have long been granted by most of the countries of Continental Europe. They are, however, unknown to the laws of this country, Great Britain and Canada.

The new Australian law is unquestionably an improvement upon the British law on the same subject, but departs not widely from the latter. A careful study of the new law fails to show that we have anything to learn in patent legislation from our Australian cousins. The citizens of the United States live under the most liberal and wisest of existing patent laws, the wisdom of which finds ample confirmation in our progress in science and the useful arts, our leading position in the industrial world and the millions of capital to-day invested in vast industries founded upon patent rights. The one regrettable feature is the parsimonious manner in which this more than self-supporting bureau is treated by Congress, the unjustifiable illiberality of whose appropriations prevents the full accomplishment of the purpose of the laws—the reward of the original and first inventor.

Electroplating Aluminum.

Aluminum, on account of its lightness and its great toughness when alloyed with other metals, has, since its production has been so enormously cheapened, that it has come into general use for a multiplicity of purposes. But one great drawback to its use is the rapidity with which its surface becomes dull and leaden in hue, owing to rapid oxidation. This characteristic has hitherto prevented aluminum from being easily electroplated with gold or silver, as copper may be: but this difficulty has now been removed by the discovery of a method by which aluminum can be given a coating of any desired metal. The film of oxide which covers the surface of the aluminum is removed by adding to the plating bath a small quantity of soluble fluoride, the metal then receives a superficial coating of zinc or copper, upon which silver or gold can be subsequently deposited. The new process will doubtless be highly valued by the makers of opera glasses, photographer lenses, telescopes, and other instruments.

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Daisy M. Wunschow, Santa Cruz, Cal. Two patents.—Both of these patents are designs, one covering a pipe rack consisting of a substantially elliptical base formed of wood and showing the grain thereof, the base being bordered by the bark of the wood. Upon the outer face of this base are located spaced springs, looped to form pipe-receiving pockets. Arranged at one end of the base is a representation of an Indian's bead. On the opposite end is placed a pail, forming a match receiver. A supporting strap for the rack is secured to the base, and consists of braided strips having fringed ends.

The other patent covers a smoking set and also has a substantially elliptical natural wood base, bordered by the bark. Upon one end of the base is arranged a block of bark, supporting a shell that constitutes an ash receiver, while upon the other end is located a pail forming a match holder. A cigar holder is arranged upon the intermediate portion of the base and is suitably ornamented, while a picture of the partially cut butt of one of the big trees of California is placed upon the cigar holder and ash receiver, the picture showing a woodman or lumberman lying in the cut.

Francis C. Cain, inventor, Beaumont, Texas; Oscar C. Herrenkind, assignee, same place. Pumping Apparatus.—The economical pumping of deep oil wells is becoming a serious question in the great oil fields of the country, and from all appearances, it seems as though the use of compressed air for the elevation of the oil will become an important factor. The pumping apparatus patented by Mr. Cain employs this fluid, and the mechanism is so arranged that it is entirely automatic, alternately forcing air into the pump barrel and exhausting it therefrom to respectively raise the liquid to the top of the well and refill the barrel. The mechanism is so arranged that it will perform the above operation with speed and precision, and is regulable to the amount of flow of the air at all times. The air in its compressed state is used over and over again, thus avoiding to a great extent the loss of power. The pump barrel consists of a cylindrical chamber from which extends the oil delivery pipe, the latter being connected at its upper end to a pipe line, which pipe line is, in turn, coupled to the top of the well casing, so that in case there should be any gushing, the abnormal flows may be taken care of. A combined air and exhaust pipe is connected to the top of the barrel and has connections with a pressure and a vacuum chamber, air being pumped from one to the other by means of any suitable pumping mechanism. A valve controls the connections between the chambers and the supply and exhaust pipe so that air is alternately forced through the pipe to the barrel to expel the oil therefrom, and then is returned in order that the barrel may be refilled.

William J. Shelton, inventor, Van Vleck, Texas; Charles M. Browning, assignee, same place. Holder for Poison.—This is an extremely unique idea and one worthy of consideration. In poisoning insects and small rodents of various kinds, it is the general custom to distribute the poison loosely in places frequented by said insects and animals. Care is therefore necessary to prevent pets and other animals, for which the poison is not intended, from gaining access to the same. Moreover, there is considerable waste in the ordi-

nary manner of distributing poison; for, after it has been collected, it can not be conveniently kept for ordinary use and is thrown away. Mr. Shelton provides a holder in the form of a disk having an annular pocket with a peripheral mouth, and within which the poison is placed. Insects and small rodents can gain access to this poison, but no large animals can reach the same. The result is that devices containing the poison can be distributed wherever desired without damage, and can be collected and kept for further use.

Peter Weynand, Hondo, Texas. Mowing Machine.—The object of the invention is to provide a simple article which may be readily applied to mowers of different size, and will effectually divide the material to be cut along the proper line of the swath, as well as separate and guide the material within the swath over the cutter bar, and after being cut, cause it to fall away from the material left standing. The result is that a clear line is left without any tangled or bunched grain to clog the cutter upon the return cut. The device consists of a deflector arm having a projection provided with a socket that receives the point of the shoe of the cutter bar. The rear end of the arm is threaded, and a clamping bracket comprising angularly disposed fingers is mounted on the threaded end, one of the fingers being provided with an opening that receives the arm, the other being bifurcated to embrace the finger bar of the cutter. Nuts are threaded upon the arm and engage the bracket to hold it against movement. In connection with this divider arm, there is employed a guide arm, secured to the front end of the divider arm and extending rearwardly and inwardly over the cutter bar, so as to direct the grain thereover, and cause the cut grain to fall inwardly away from that left standing.

John Wahlberg, Eureka, Cal. Hook.—The invention relates to a novel and efficient lock hook, designed for use in connection with singletrees. A body is employed that comprises spaced face plates or disks, having aligned notches in their edges and a loop at one side, by means of which the hook can be attached to a singletree. A hook is provided with a head disk that is revolvably fitted between the face plates, the disk normally closing the notches in the latter and being provided with a cut-away portion disposed opposite the intumed nib of the hook. This cut-away portion is arranged to be brought into register with the notches in the face plates, in order to permit the introduction of a link into the hook.

George L. Griffin, Robert A. Griffin, Chelsea B. Griffin and Herbert E. Griffin, Houston, Texas. Mechanism for Converting Motion.—The invention relates to apparatus for converting reciprocity into rotary motion, and the object is to provide practical mechanism of this character in which rotary motion may be imparted to a driven member by a reciprocity driving member without occasioning any dead centers; and furthermore, to provide simple means for reversing the direction of motion of the driven member whenever it is found desirable or necessary. A reciprocity driving frame is employed, comprising spaced side bars, said frame being driven by a suitable power, as, for instance, an engine of the reciprocity piston type. A rotary driven member is located between the side bars, and comprises spaced sprocket wheels around which passes a chain. A pawl is pivoted upon each of the side bars of the frame and has oppositely disposed dogs, which are alternately moved into, and out of, engagement with the chain during the reciprocation of the driving frame. These dogs can be reversed, so that the chain can be driven in opposite directions, and

therefore, the motion of the driven member changed without in any manner affecting the driving member.

Stephen A. Taylor, Denver, Col. Gate.—The gate covered by this patent belongs to that class known as "hand openers," and can be opened and closed from either side by a person in a vehicle or on horseback, without the necessity of alighting or dismounting. The particular feature of the gate resides in means for both actuating and holding the gate, this means being made more secure by being itself locked against movement when the gate is either in opened or closed condition. Another feature relates to operating means, which is positive in action in both directions, thus insuring the proper movement of the gate against heavy winds and under other unfavorable circumstances. The gate itself may be of the ordinary swinging type, and located at one side of the same is a standard. A holding bar comprises pivotally connected sections, one of which is pivoted to the gate, the other being swung upon the standard. Locking means are employed for holding these sections against relative movement, and cables extending on opposite sides of the gate pass about a drum formed upon the sections that are carried by the standard, this cable also constituting means for operating the lock.

William S. Rice, of Adams, N. Y. Truss.—The invention relates to improvements in trusses for hernia or rupture, and an article of this kind has been devised provided with a pad which has a wide range of adjustment, can be properly fitted and positioned after the truss has been applied, and will always hold its place. Furthermore, the structure is so arranged that the inward strains thereupon may be varied as desired. The invention is an important improvement in this class of structures, and is being successfully introduced into the United States and many foreign countries, where it has been thoroughly protected by patents.

Michael C. Donahue, inventor; F. A. Neff, John Skinner and F. G. Armbruster, assignees, Colorado Springs, Col. Hanger for Electric Lamps.—Among the more important objects of the invention covered by this patent, has been the aim to provide a comparatively inexpensive structure which will support an electric lamp at any height desired, and in which there will be no sparking during the raising and lowering of such lamp. A sectional casing is employed, the upper section being adapted to be secured to a ceiling or wall and carrying a frame in which is mounted a drum for the electric light coil. This drum is actuated by a spring, and the cord thereon is in electrical communication through the hubs of the drum with a rosette enclosed within the casing. The cord is adapted to wrap upon the drum and extends down through the lower casing which carries an automatic clutch, by means of which the same may be held against movement. In operating the device, draw down the cord until the lamp suspended therefrom is at the height desired, and then lock it by means of the clutch. To raise the same, it is only necessary to release the clutch and permit the cord to wrap itself upon the drum, said drum being then actuated by the spring.

James Mann, Yorkton, N. W. Territory, Canada. Sleigh Runner.—The object in view by the inventor, and one that is successfully accomplished by the invention, is the provision of simple means by which the runners of sleighs are thoroughly braced and strengthened in order to prevent breakage at the point where the greatest weight is applied, namely, beneath the beam support or knee. To do this Mr. Mann applies, beneath the runner body and above the shoe, a transverse clip having

eyes through which pass truss rods extending on opposite sides of the runner and longitudinally and diagonally thereof, these rods being connected at their front ends and secured to a clip that is fastened upon the front portion of the runner body. The rear ends of these rods pass through an ear secured to the rear end of the runner, said rear end having nuts threaded thereon by which the strain upon the truss rod may be augmented to any degree desired.

Elmer E. Reese, Rolling Prairie, Indiana. Mail box.—This invention relates particularly to improvements in that class of mail boxes employed in the rural free delivery system of the Post Office Department. The advantageous features reside more particularly in the simplicity and efficiency of the structure, so that the boxes can be constructed at small cost and sold at a low price, at the same time being weatherproof in order to properly protect the contents from the elements, and also being thoroughly strengthened to withstand hard usage or the attempted forcing of the same by an unauthorized person. Briefly described, a receptacle member is employed having a semi-cylindrical wall, the side margins of which are turned back against the outer face thereof and are out-turned for form flanges. Beads are located along the free edges of the flanges and enclose strengthening rods. A semi-cylindrical cover member fits over the receptacle member and has outstanding side flanges also provided with beads that enclose strengthening rods. Reinforcing strips are secured across the ends of the cover member and are attached to the ends of the rods that are carried by the flanges of said member, these reinforcing strips having hinge connections with one of the rods of the receptacle member. The ends of the receptacle member are circular disks, the upper portions of which are enclosed by the cover member when the same is in operative position.

Joseph W. Feathers and George Mills, Albion, N. Y. Harvesting Implement.—The above inventors are probably the first to devise a successful implement for conveniently harvesting cabbages and similar vegetables. They have provided an instrument by means of which a cabbage may be cut from its stalk without being injured, and with the same implement may be thrown into a wagon without in any manner injuring the vegetable itself. The device consists of an ordinary handle at one side of which is located a cutting blade, formed of sheet metal and having a notch provided with a cutting edge, the outer margin of the blade being coiled. This blade is connected to the handle by wire arms forming substantially a basket. In operation, the blade is passed beneath the cabbage, and the stalk thereof entering the notch will be severed, the coiled margin preventing the cabbage itself from being injured. The cabbage thus severed from its stalk drops into the basket formed by the connecting arms, and can be thrown into the wagon or other receptacle.

Julian Magruder, Jr., and George C. W. Magruder, Roanoke, Va. Lamp Attachment.—The object of this invention is to provide a simple and efficient device adapted to be readily applied to an ordinary lamp for holding the burner, while the lamp is being filled, and capable also of supporting a match-safe, providing a shade for the eyes, and a reflector for throwing the light. The attachment, which is provided with means for detachably engaging a lamp, has a combined burner support and shade-holder. The shade-holder is arranged to form a stop for retaining the burner on the holder.



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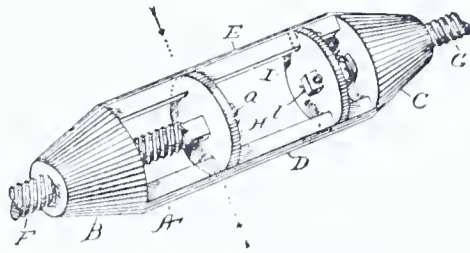
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THE PATENT OFFICE.

From the report of the condition of work in the examining divisions of the Patent Office at the close of business December 6, 1904, printed in the Official Gazette of December 13, 1904, it appears that there were 14,923 applications awaiting official action, and that some of the divisions of the Patent Office were between one and two months in arrears, others between two and three months, still others between three and four, and two divisions were between four or five months behind with the work. Such a statement, however, does not give a clear understanding of the delays to which an application for patent may be subjected, without taking note of the condition of the amended work.

There was once a time in the prosecution of applications for patents before the Patent Office, when amended cases had precedence, but this no longer obtains in many divisions of the Patent Office. Indeed, in some divisions, new cases are given precedence, notwithstanding the fact that Rule 63 of the Patent Office Rules of Practice states that:

"Applications which have been put in condition for action by the examiner shall be entitled to precedence over new applications in the same class of invention."

This rule is honored more in its breach than in its observance, as will appear by a reference to the Official Gazette. An applicant might be led to think, by examining the report showing the condition of work, that by waiting a period from one month to five months he might expect the issuance of his patent, but the greatest delay follows after the case has been reached and officially acted upon. Perhaps not one out of twenty-five cases is allowed on the first official action. Either some of the claims are rejected, or formal objections are made necessitating the filing of an amendment on the part of the applicant or his attorney. Thus, after an

applicant has waited a period from one to five months for the first official action, he frequently has to wait a similar period for the second official action on the amendment which has been filed in his application; and if, as is very often the case, a number of official actions are taken, necessitating a corresponding number of amendments, the allowance of the application is delayed many months. Indeed, in some divisions of the Patent Office, it is impossible to obtain the grant of a patent within less than a year.

We are not in favor of railroading cases through the Patent Office, and we heartily condemn the practice of those attorneys who do not contend for broad claims in prosecuting applications for patents; but the practice of the Patent Office in delaying the consideration of amended cases, and not following strictly Rule 63, injures those practitioners who are endeavoring to give honest service to their clients. The unfaithful solicitor of patents obtaining the allowance of a single claim on the first official action in an application, invariably cancels the rejected claims and secures the grant of a patent at once. But the conscientious attorney who urges the examiner to grant some of the rejected claims, either in their original or amended form, is condemned by his client for the delay to which his application is subjected. The Patent Office, by giving precedence to new applications rather than to amended ones, is practically playing into the hands of dishonest solicitors of patents, and unwittingly doing injustice to the careful, conscientious attorney. This should not be. We know that most of the officials of the Patent Office are in thorough sympathy with those attorneys who are desirous of obtaining for their clients just as broad protection as possible, and that, in many instances, they will suggest to the attorney how claims may be broadened; but, when applications which have been amended and put in condition for further action, are laid aside for a period of from one to three months before they are taken up again, the Patent Office not only injures the applicant and his attorney, but the injury reacts on the Patent Office.

Inventors now watch the Patent Office Gazette and other patents more closely than they formerly did, and they take note of the issuance of patents filed after their applications were made, and think that this is due to favoritism on the part of the Patent Office. Of course we know differently, but it is not always possible to explain the true reason to the inventor, and the opportunity to make such explanation frequently does not present itself. Thus, some inventors gain the impression that the Patent Office is run in the interest of certain favored inventors, and that politics control this branch of the government.

We believe that the condition of work in the Patent Office would be improved by following Rule 63 strictly, giving precedence to amended cases, and issuing a rule that amendments should be taken up for action

within fifteen days after the filing thereof. While this would delay action in new cases, we know that inventors would be better satisfied by such a rule, for it would result in their obtaining their patents within a shorter period. It is certain that a greater number of inventors would be pleased by such a practice than at present, and we earnestly urge this matter on the attention of the officials of the Patent Office.

The Pending Trade Mark Bill.

The AGE has repeatedly commented on the need for a new trademark law, and referred to a bill now before Congress to amend the trademark laws. In October of 1903, the AGE printed a copy of the proposed law. At the present time, there seems to be a good prospect of the bill passing Congress at this session. The House Committee on Patents, having charge of trademark matters, has reported favorably the bill referred to, and it is now up for action.

Briefly, the measure provides that the owner of a trademark used in commerce with foreign nations, or among the several states, or with Indian tribes, provided such owner shall be domiciled within the territory of the United States, or located in any foreign country which affords similar privileges to the citizens of the United States, may obtain registration for such trademark by complying with the requirements of the law.

In view of the decision of the Supreme Court of the United States in Warner vs. Searle & Hereth Company, which was commented on in the May, 1904, issue of the AGE, there would seem to be an urgent necessity for the amendment of the present law.

The Supreme Court has decided that a registered trademark is by the wording of the law, strictly limited to commerce with foreign nations and with Indian tribes, and that such mark can only be infringed when used in that commerce without right by another than its owner. The larger field of interstate commerce is not protected by the present law; but it is the aim of the bill now before Congress, to cure this glaring defect. There should be no further delay in the enactment of the law, as it is in the interest of the public, as well as the owners of valuable trademark rights, for the public is interested in preventing goods being palmed off under false trademarks, causing deception in the purchase of such goods.

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Think Straight.

It would be impossible for a lawyer to make a reputation in his profession while continually thinking about medicine or engineering. He must think about law, and must study and become thoroughly imbued with its principles. It is unscientific to expect to attain excellence or ability enough to gain distinction in any particular line while holding the mind upon and continually contemplating something radically different.—*Success*

This is excellent advice, and it seems appropriate for the AGE to refer to it for the reason that it is peculiarly applicable to certain persons who are practicing before the U. S. Patent Office as patent solicitors.

There are, at present, in the neighborhood of 5,000 patent attorneys registered by the Patent Office, and out of this number probably one-fourth are engaged in other lines of work as civil engineers, mechanical engineers, attorneys-at-law, or draughtsmen.

This twentieth is notably a century of specialization. In order to keep abreast of the times and succeed in any undertaking, a man must concentrate on one line of endeavor. A patent attorney should engage in patent business exclusively.

The best patent attorneys are those who devote their entire time and attention to their profession. We have yet to see a successful attorney who dissipates his strength in different fields of work.

We have in mind the case of a man who was a dancing master, as well as a solicitor of patents, pensions, lands, and claims. Instances of this character are within the observation of all.

Youthful Inventors.

A dispatch from Boston says that two fifteen-year-old boys of that city have established a wireless telegraphic connection between their homes, half a mile apart. This recalls the fact that thirty days after the appearance of the first published accounts of Bell's invention of the telephone, two New York boys had built and were successfully operating an experimental telephone system of their own. These two boys have since achieved distinction in the electrical field, and have been for many years allied in business. They are Prof. Frank B. Crocker of Columbia University and Doctor Schuyler Skaats Wheeler.

To keep themselves posted in the progress of the art in which they are interested, inventors and manufacturers should subscribe for the INVENTIVE AGE, which publishes a list of all patents issued each month. The low subscription price and the character of the publication, entitle it to the support of all the inventors of the country.

SCIENTIFIC

PROGRESS.

Protecting Steel.

The method of pickling steel in order to protect it has been common for sometime in Europe, and has just been tried on a bridge in New York. The pieces are boiled in a 10 per cent solution of caustic soda to remove grease, and then rinsed in boiling water. Afterward they are dipped into a boiling 10 per cent solution of sulphuric acid, until all the oxide is removed. They are again rinsed in boiling water, and dipped into a solution of carbonate of soda, to free them of any trace of acid. Finally they are rinsed, dried over steam pipes and then treated by a process of enameling.

Telephones in Abyssinia.

Another forward step of civilization has been marked in Abyssinia—telephones are being provided in that remote and savage region. Nearly 800 miles of wire have been put up, and 1000 more are in process of construction. The contractor who is doing the work for the government, however, has to encounter unusual difficulties. Tropical rains wash out the poles, white ants attack with gusto the parts imbedded in the ground, and when iron poles are substituted for wood, the natives steal them to make tools of. Monkeys find the wires delightful swings, and elephants use the poles as scratching posts—often rubbing them down in their strenuous movements. Lastly, the jungle grows so fast that a party of men is kept constantly busy in cutting away the young growth. Altogether, the telephone constructor's life in Abyssinia is not a happy one.

New Ore Finder.

In view of the increasing difficulty of getting a good supply of native ore, considerable interest is being taken in a new electrical ore finder, which it is claimed has been very successful in locating lodes, reefs or strata of ore in England. It is said that by the use of this device, the expert listener can judge with surprising accuracy how deep the lode is, and in which direction it runs.

The apparatus, which is the joint invention of an American and an Englishman, is extremely ingenious, and in the hands of experts, admits of the most delicate manipulation. The essential principle of its working is that it emits not a continuous current, but a series of little, short, sharp impulses. These will go forward in all directions, and when they meet with quartz rock or metallic lodes, the waves are so modified that the listener can form a judgment where the ore bodies causing the variation of the sound are situated. In a recent experiment, the apparatus indicated the position of the deposits so accurately that when the company owning the land put down a bore, hematite was found at about the depth adjudged. In a similar way, with variously attuned apparatus, gold has been located in Alaska and Siberia, lead in Wales, copper in Cornwall, etc. The discovery, which calls to mind the divining rod of ancient superstition, is likely to prove of great importance to mining interests.

The Telemeter.

An officer in the Italian army has invented an instrument for accurately measuring long distances, by day or night, that is attracting considerable attention on the other side of the water. The urgent necessity of something which would record promptly and accurately long distances, especially in time of war, prompted the officer to employ his best efforts in evolving an apparatus that would meet these requirements. He worked diligently for years, and has succeeded in inventing a telemeter that possesses all the good qualities of a perfect measurer of distances, which include the easy means of handling it, combined with quickness and exactness in operation. No figuring, no calculating are necessary, the instrument doing all the work.

Even if the target changes position, not the slightest difficulty is experienced in recording the distance. Another feature is the facility with which the apparatus can be removed from one place to another.

The device consists of a sextant, which instead of showing the angles to be measured, follows the distance, squaring the reflection. Two operators are required to manipulate the astronomical instrument. Excellent results have been obtained by this device up to two thousand yards. An orderly handles the square and an operator is placed on the point where two lines meet at a right angle, while the other operator with the sextant measures the angle, moving the wheel. The distance is at once marked and designated on the apparatus. For measuring wide spaces, a small telescope is used, which can be readily wrapped up with each apparatus.

Making of Patent Leather.

All manufacturers of patent leather have their own tanning processes, much like those of the calfskin tanner: though some patent leather is given a bark tanning. Horsehide and colt skins are the chief leathers made with a patent finish.

The patent or enamel finish is really painted and baked on, as the bicycle manufacturer paints and bakes enamel onto a frame. Tanners are very particular about keeping their processes secret, and nobody but workmen is ever allowed into the finishing rooms.

The hide or skin, having been stretched and dried as much as possible, is first given a coating of a mixture of linseed oil, litharge, white lead or similar materials boiled together until they make a pasty mixture.

This is daubed on the surface with a steel tool and well rubbed in, so that the pores of the leather will be filled up. Then the leather is put into the oven, its surface being exposed to steam pipes at a temperature of about 160 degrees.

Next the surface is rubbed down with pumice stone, and then it is covered with linseed oil and ivory black, about six layers applied, each layer being dried and rubbed down. Finally a varnish is applied, and then the surface is rubbed down and finished off as nicely as a painter finishes a fine carriage.

Preservation of Butter.

The French National Society of Agriculture has recently received from one of its members an interesting communication on the preservation of butter by fluoride of sodium. The writer says this substance is not hurtful unless administered in doses of 463 grains a day for animals weighing 125 pounds. From 4 to 15 grains suffices for 2 pounds of butter, which it will preserve indefinitely. It is stated that the strength of the fluoride, so far as its effect upon the health is concerned, is diminished one-half by mixing. If, however, it retains its full strength, no inconvenience can result, as many physicians prescribe as much as 6 grains every twenty-four hours in order to regulate indigestion.

It is further stated that the fluoride can be used only in infinitesimal quantities, as more than 7 grains to a pound of butter renders it unpalatable, but that instead of making the butter indigestible and less nutritive, the fluoride, when used properly, is considered an aid to digestion.

The "Autopyrophon."

A new and simple automatic fire alarm has been invented and patented by a Danish scientist. The apparatus, which is called the Autopyrophon, acts only when a sudden wave of heat is generated in an inclosed space, but is not influenced by a general and evenly high temperature. It consists of a small glass tube bent in the shape of a capital U. This tube, the ends of which are closed, is half filled with mercury, the other upper half containing a highly volatile liquid—for instance, sulphuric ether. One of the upper parts of the glass tube is surrounded by a cover of some nonheat-conducting material, so that a sudden rise of temperature affects only the other or free part of the glass tube. In case the temperature rises evenly the whole apparatus is affected and no warning signal is given. If, however, the temperature in the room is suddenly raised, as by the outbreak of a fire, the ether above the mercury in the glass tube, which is unprotected, evaporates, and the pressure of the generated vapors causes the mercury to sink in the tube while it rises in the opposite part.

Both parts of the tube are fitted with an electric wire melted into the glass, so that when the mercury stands equally high in both tubes the electric current passes through and the apparatus remains silent; but should a movement of the mercury take place because of a sudden rise of temperature, the electric circuit or contact is impeded, and any kind of electric alarm may be set into motion at any distance and at as many places as required. The apparatus also indicates impediments and interruptions in the electric current. The substances need no renewal and the apparatus acts an indefinite length of time.

At one of the demonstrations, the alarm was raised within eight seconds from the time a small heap of shavings was set on fire in the corner of an ordinary sized room. In this case the apparatus was fixed near the ceiling at the end of the room, opposite that where the shavings were burning.

It is calculated that one apparatus is needed for an area of 600 to 800 square feet.

The apparatus is manufactured in Berlin, and is retailed at \$2.86. The company has lately fitted the palace of the Crown Prince of Germany with this device.

RADIUM WILL CLARIFY DIAMONDS.

The Continual Vibrations Caused by the Bombardment of the Radium Emanations Produce the Change.

The universal interest awakened by recent experiments with that wonderful new property of matter, radioactivity, has served to make the world of readers generally aware of the fact that diamonds phosphoresce brilliantly in the dark when exposed to the emanations from radium. Indeed it has been suggested that this property offers a sure and ready means of detecting fraudulent stones. But Sir William Crookes has just discovered that radium produces another effect upon diamonds which is still more remarkable, and possibly of more commercial importance. It appears to be able to cure the defect of "off color" stones by changing their objectionable yellowish hue to the desirable pale-blue or blue-green tint characteristic of first-water gems.

Sir William took two yellowish diamonds, closely matched in color and quality, and placed one of them inside a tube containing radium bromide, keeping it there continuously for a period of seventy-eight days. In the meantime the other stone was kept in a drawer, carefully placed at a safe distance from all radium and other radio-active substances. At the end of the time mentioned the two diamonds were compared, and it was found that the one which had been subjected to the action of the radium emanations had been deprived completely of its yellowish color, but at the same time its surface had been considerably darkened with a deposit of graphite. After being heated, however, for ten days, in a mixture of strong nitric acid and potassium chlorate, the dull film disappeared, and the stone appeared perfectly transparent and sparkling with a beautiful blue-green tinge.

The explanation seems to be that the state of continual vibration in which the diamond was kept by the bombardment of the radium emanations for so many days produced an internal change, resulting in an alteration of the color of the stone. Thus the effect of the emanations, as the experimenter suggests, may be to cause a chemical as well as a physical change, and he adds that, if the yellowish hue is due to the presence in the diamond of iron in the "ferric" state, a reduction to the "ferrous" state would quite account for the change of color. It may be said, by way of explanation, that iron in the ferric state shows a yellowish or reddish color, and in the ferrous state a greenish or bluish color.

This discovery is one of the most interesting as well as most unexpected that has yet been made concerning the effects of the radium emanations. The investigating chemist, interested principally in the purely scientific aspects of the phenomenon, is not likely to care very much about the possible results on the diamond market, but possessors of off-color stones may comfort themselves with the thought that science has possibly found a way to increase the value as well as the beauty of their jewels, although, in the present state of the matter, it would, perhaps, cost more to "cure" a cheap stone by a course of radium treatment than to exchange it for a better one.—Success.

A CLASSIFIED list of Patents issued during the month appears in each issue of the INVENTIVE AGE. This keeps inventors and manufacturers posted in the art in which they are most interested.—We will send, postpaid, to any address, printed copies of any U. S. patent, with specifications and drawings, upon receipt of 10 cents per copy; twenty copies \$1.50.—Please give correct data in ordering.—Address,
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Chain making machine..... S. B. Martin et al
Chair..... F. J. Hollis
Check controlled apparatus..... F. B. Townsend
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Cigar lighter, Electric..... W. Roche
Cigarette paper books. Apparatus for making..... J. C. Drucklieb
Cigarette tubes. Manufacture of pasted..... A. Benoit et al
Circuit breaker..... A. F. Christmas
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Circuit operating device..... C. F. Hopewell
Clasp..... F. N. Ashworth
Clock. Geographical..... J. J. St. Ledger
Clothes clamp..... A. Anderson
Clutch, Friction..... C. H. Nystrom
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Coal or other material. Apparatus for transferring..... J. Campbell
Coal storage plant..... A. M. Acklin
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Coaster and brake device..... A. P. Morrow
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Cock for pressure brake systems. Angle..... F. B. Morrison
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Computer and printer..... W. H. Clark
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Concrete steel construction..... P. Kuhn
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Condensing exhaust steam..... J. Tinsley
Conveyer..... W. C. Mackellar et al
Conveyer..... M. T. Ash
Cotton chopper..... H. T. Anderson
Cotton picking or harvesting machine..... J. W. Webb
Cotton weevil destroyer..... L. A. Stephens
Cultivator attachment..... W. P. Allgood
Curb protector..... J. B. Ausley
Current generators. Regulating apparatus for constant..... M. Leblanc
Current motor. Alternating..... M. Milch
Curtain securing device..... H. D. Roe
Cut off Pipe..... G. W. Howell
Dental preparation for capping pulps..... reissue. A. L. Bower
Derailment guard..... E. Mueller
Despatch box for overhead lines. Electric..... R. T. Piscicelli
Dish washer..... J. J. Miller
Display device..... C. E. Wilton
Display stand..... C. E. Wilton
Displaying device. Curtain..... E. D. Valliant
Distilling and evaporating apparatus..... W. H. Gesner
Door. Automatic sliding..... F. Dentler
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Door fitting device..... M. W. Washington
Door opening and closing device..... J. F. Connell
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Double bell supply..... W. J. Kohler
Draft and buffing rigging..... R. D. Gallagher, Jr
Draft gear. Friction..... C. J. O'Neill
Drawers and petticoat. Combined M. Butler
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Electric battery..... C. F. Mackey
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Electric lights. Current limiting switch for..... H. W. Brown
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Electric time switch..... B. Dubinski
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Electrical testing apparatus..... W. J. Kyle
Electrode clamp. Battery..... E. G. Dodge
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Engine..... J. D. Ferry
Engine electric igniter. Gas..... R. J. Cooper
Engines. Automatic regulating device for explosive or internal combustion..... F. M. Rites
Ensilage cutter..... M. W. Drew
Envelop..... B. F. Mohler
Explosion motor..... S. S. A. Lewis
Eyeletting machine..... P. R. Glass
Fabric steaming and pressing apparatus..... E. I. Fletcher
Fare register operating device..... J. F. Ohmer et al
Fastener..... E. N. Humphrey
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Feed water heater..... E. Ekenberg
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Fence machine. Wire..... C. S. Hensley
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Fence post..... J. W. Shock
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File. Vertical letter..... J. R. Buckwalter
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Fire alarm box..... H. Smith
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Cattle guard F. Bartlett
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Cellulose, Manufacture of C. Keilner
Cementing machine F. M. Wade
Centrifugal separating F. B. Pettengill
Chair head rest F. De Fontes
Charging hopper B. Boulger
Check, Bank J. W. Amrath
Checks, &c. Device for preventing fraudulent
raising of L. Smith
Checkrein J. R. Griffith
Chute E. Roenius
Cigar band remover W. B. Duncan, Jr
Cigarette making device G. F. Barron
Clasp C. K. Pevey
Clock bell A. Junghans et al
Clock, Striking V. Odquist
Clothes horse T. I. Buffy
Clothes horses, &c. Supporting device for
..... A. Crossman et al
Clothes line fastener J. C. Meyer
Clothes pounder J. W. Hamm et al
Coal holing and cutting in machine
..... A. E. Millward
Coal separator J. & W. H. Fern
Cock time controlling mechanism, Gas
..... C. Russ
Coffee hulling machine K. Champney
Coffee pot E. B. Travis et al
Coke oven G. S. Ramsay
Collar G. P. Cragin
Combing machine, Silk E. H. Rollins
Commutator M. Milch
Compacting finely divided materials
..... 2 pats P. Lorillard
Compacting machine A. T. Deane et al
Concrete or cement building block molding ma-
chine J. W. Tinsman
Condenser J. Splidorf
Controlling switch H. E. White
Core box for foundry use A. Scott
Cork extractor J. D. R. A., & A. F. Effenberger
Corn husking machine H. E. Moore
Corn or grain knife L. R. Tilley
Corset C. L. Olmstead
Cotton chopper G. Cagle
Couch head rests, &c. Adjusting mechanism
for G. W. Drury
Couch lid lifer, Box W. S. Duval
Crate J. H. Winkelmeyer
Cultivator attachment J. A. Schowalter
Cultivator, Corn H. Stripe
Cultivator, Lister K. M. Kimbrough
Curative apparatus J. & W. Titus
Curb and snaffle bit, Combined
..... K. J. Melleby
Current motor, Alternating C. Wust-Kunz
Current selector, Alternating H. Hemp
Curtain stretcher A. C. Mallory
Cuspidor, Railway car E. Metzger
Cutter G. E. Ginn
Cutting or cleaning tool C. Brick
Die marking and laying out machine
..... W. J. Richards
Directory, Telephone N. B. Porter
Display cabinet J. L. Tandy
Display fixture E. T. Palmenberg
Door fastening L. A. de Mayo
Door hanger G. Lane
Dowel pin machine B. Danhof
Drill and underreamer E. McCray et al
Drill press, Multiple spindle C. D. Rice
Driving bit L. J. Elliott et al
Electric furnace C. P. Steinmetz
Electric generators, Means for exciting dyna-
mo W. L. Bliss
Electric kiln F. E. Dickinson
Electric machine frame C. Dihmann
Electric machine synchronizing device, Dyna-
mo L. C. Marburg
Electric meter E. R. Whitney
Electric motor F. B. Duncan
Electric motor controlling system
..... G. Westinghouse
Electric motor controlling system
..... G. Westinghouse et al
Electric time switch J. E. Yates
Electrical distribution system W. L. Bliss
Electricity on railway or other vehicles, Gen-
erating and distributing F. J. Beaumont
Electrode and making same, Storage battery
..... E. A. Sperry
Elevator rope gearing C. I. Hall
Elevator safety appliance P. G. Grobengieser
Embroidering machine A. Laubscher
End gate R. W. Barber
Engine R. M. Shaffer
Engine speed adjusting device, Fluid pressure
..... C. Robinson
Engraving machine M. Barr
Envelop J. H. Lamb
Excavator C. L. Payne
Exhaust heater for compound motors
..... T. G. E. Lindmark
Eyeglasses E. G. Kay
Eyeletting machine J. W. Barne et al
Fan or blower W. A. Cross
Farm roller F. E. Sydam
Farrier's anvil attachment G. H. Yahraus
Fastening O. G. & G. A. Joseph
Fatty substances, Producing granulated and
solidified J. Westaway
Fence post R. B. Bennett
Fence post F. L. Williams
Fence post J. M. Marsh
Fence stay fastener, Wire E. Bartholomew
Fertilizer distributors, Automatic reversing
attachment for H. A. Zobrist

Filling machine, Automatic W. Koedding
Filter J. E. Langill
Fire extinguisher, Chemical A. G. Stevens
Fire extinguishing apparatus C. Nuhning et al
Fire in oil tanks, Apparatus for extinguishing
..... J. P. McCann
Fire kindler L. Roehm et al
Fireplace M. F. Frechtling
Fireproof paint or coating E. R. Stowell
Fishing rod reel seat L. L. Bartlett
Fruit jar or package and sealing same
..... W. W. Vaughan
Fruit pitter J. A. McCune
Fuel feeding mechanism for internal combus-
tion motors A. E. Brillie
Furnace B. H. Cass
Furnace charging apparatus S. Forter
Furniture, Combination piece of
..... J. M. Forbes
Game apparatus J. C. Reckweg
Garbage crematory S. Boulger
Garment supporter C. A. Couch
Garments, Dry cleaning L. E. Barbe
Gas, Apparatus for the manufacture of
..... H. A. Bradley
Gas burner, Acetylene W. H. Drake
Gas generator, Acetylene J. W. Featherstone
Gas igniter, Distance operated G. Weinmann
Gas light flashing device C. Ridderhof et al
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Gear, Change speed A. Soames et al
Gear, Reversible friction drive
..... A. MacGregor et al
Glass, Device for clamping together show
case or other W. E. Gould
Glass panes to their frames, Means for attach-
ing T. Robertson et al
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Grading machine W. W.
Grain elevator, Portable H. O. Sparks
Gramophone plate holder R. Buigi
Grinder, Lathe center H. C. Barnes
Grinding machine L. B. Benton
Grindstone tool holder S. L. Derby
Gun rifle attachment, Shot W. Smith
Hame, Horse collar extensible
..... J. H. Winterwood
Hammer, Power T. H. Griffiths
Handle fastening for suit cases, &c
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Harrow attachment N. Paulsen
Harvester reel support W. J. Berkeley
Hat head rest J. Jaeger
Hay loader C. L. Samp
Header F. E. Fox
Heating and ventilating buildings
..... I. S. McDougall
Heating ovens, &c. Apparatus for P. Fox
Herbicide, Implement for applying
..... A. von Hoffmann
Hide or skin washing and tanning device
..... R. Koenitzer
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Hitching strap weight, Automatic
..... E. M. Joll
Holder P. J. McGuire
Hook G. W. Begole
Hook and eye T. D. Richardson
Hook and eye, Safety pin E. A. Campbell
Hopper flange W. U. Griffiths
Horse detacher W. W. Arnold
Horse releaser H. A. Levitt
Horseshoe calk P. T. Bertholf
Hose binder J. J. McIntyre et al
Hose coupling, Universal J. F. Thomas
Hose supporter V. Guinzburg
Hot water heater C. A. Cleveland
Hub, Wheel F. M. Ashley
Hub, Wheel H. N. Thayer
Hydrocarbon burner
..... C. H. Montgomery & Agramonte
Ice shaver S. E. Perkins
Incandescent burner J. B. Salo
Incandescent mantles, Fixture arm burner
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Incubator C. E. & G. W. Goss
Incubator W. H. Hughes
Ingots, Shearing mechanism for cutting
..... J. R. George
Ink well A. G. Prokopovitch
Insulator L. W. Greene
Iron or steel, Treating sheet H. H. Goodsell
Ironing machine safety gear E. J. Lane
Jar or similar vessel closure A. F. Wilson
Journal bearing F. W. Hallock
Journal bearing, Automatic adjustable wedge
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Ladder or similar structure M. Murphy
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Lamp, Acetylene gas G. Massini
Lamp, Electric arc L. S. Anderson
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Latch C. H. Blanding
Lathe center rest O. E. Masterman
Lathing for buildings, Sheet J. D. O'Brien
Lime slaking apparatus B. C. White
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Liquid receptacle, Multiple A. L. Pepin
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Log raft A. Becker
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Loom for cross weaving R. Bates
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Lubricator M. F. Dolphin
Magnetic qualities of materials, Testing the
..... F. Holden
Mattress, Spring W. J. Baker
Measurer, Automatic grain F. Beutler
Measuring cloth, &c. Machine for J. H. Ferris

Mechanical motor W. H. Vanfossen
Mechanical movement H. C. Stone
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Medicinal purposes, Apparatus for generat-
ing steam for M. F. Hentschel
Memorandum pad A. D. Robinson
Metal tie C. G. Thompson
Milk receptacle E. S. Moore
Mine ventilator G. Himrod
Mold drying apparatus C. C. Smith
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Molding machine W. H. Schorling
Monorail traction C. E. Faroux
Motion transmitting mechanism T. J. Kebue
Motor casing G. E. Jacobson et al
Motor gearing, Frictional E. W. Wickey
Mowing and harvesting machine F X Sammer
Muffler H. Ford
Muffler E. C. Richard
Music educational device or self registering
compound musical key E. A. F. Schmidt
Musical instrument picker, Stringed
..... J. W. Whitlock
Musical instrument, Self playing C. A. Shaffer
Newspaper clip D. D. Burgess
Nickel oxid and ammonia, Recovering
..... H. A. Frasch
Oil burner A. F. Chace
Oil burning device F. E. Nelson
Oil cup A. Uhri et al
Oiler G. F. Godley
Order board H. Kaplan
Overhead carrier and track for same
..... H. C. Smith
Packing, Trottle valve stem S. Lockhart
Pail, Steam dinner J. T. Lemus
Panels, &c. Manufacture of molded or em-
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Panels, Manufacture of molded or embossed
..... T. J. Palmer
Paper box for packing bottles J. T. Craw
Paper cutter A. W. Rau
Paper cutting machine A. C. Hilsinger
Paper making or like machinery, Roll for
..... H. Parker
Paper tray H. P. Shotts
Pea shelling machine J. H. Empson
Pea shelling machine rotating drum
..... J. H. Empson
Peat fuel, Manufacturing C. F. Schlickeyseu
Pen, Fountain J. Blair
Percolator W. B. Webber
Phonograph C. W. Noyes
Phonograph records, Making molds for dupli-
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Phonograph reproducer attachment C. E. Hill
Phonographic records, Manufacturing cellu-
loid cylinders for receiving A. N. Petit
Piano player, Pneumatic F. V. Crofut
Picture exhibiting apparatus, Moving
..... N. Power
Picture exhibitor L. J. E. Colardeau et al
Picture hanger L. & E. E. Thomas
Pipe wrench B. Meczynski
Pipe wrench, Chain G. Amborn et al
Planter, Corn L. D. Benner
Planter, Cotton seed J. R. O'Neal
Plate holder kit B. J. Young
Platen press E. T. Cleathero
Plow J. Clayton
Plow, Bedding and furrowing disk A. Horner
Plow disk adjustment C. Wagner
Plow leading furrow wheel and guiding mech-
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Plow riding attachment D. Freeman et al
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..... C. Wagner
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Plumb bob and line reel, Adjustable
..... G. A. Coleman
Post base W. H. Alexander
Powder and liquid distributing device
..... H. Cutting
Powder, Apparatus for the manufacture of
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..... J. J. Rafter
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Printing plate heater G. H. Kendall
Printing press A. W. Proctor
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Pruning implement J. B. Carpenter
Pulley block and spring latch gate
..... M. G. Hilpert
Pump, Polycellular centrifugal A. Maginot
Pump, Steam and vacuum 2 pats
..... A. G. Waterhouse
Pump valve F. McCulloch
Pumping apparatus, Steam and vacuum
..... A. G. Waterhouse
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Punching or drilling machine spacing mech-
anism M. L. O'Brien
Puppet, Springing and dancing R. Uhrig
Pyrometer, Recording F. N. Speller
Quilling machine G. Adsit
Rail brace F. P. Marling
Rail joint C. G. Ford
Rail joint J. M. Walker
Rail joint W. J. Gillespie
Rail joint and bridge piece, Combined
..... J. G. Barrett
Rail joint and chair, Combined
..... Y. & J. G. Arndez et al
Rail splice or joint J. H. Kline
Railway signal J. Crumley
Railway switch foot guard W. Sheridan
Railway switch lock A. A. Strom
Railway switch operating means
..... J. F. McCormick
Railway tie C. D. Anderson
Railway tie A. J. Harlow
Railway tie, Metallic P. F. McCall
Railway traction means, Street C. L. Varner
Razor, Safety E. B. Gifford
Receptacle P. H. Fielding
Recording and reproducing speech, &c. Ap-
paratus for E. E. Ries
Reflector attachment for windows, Street
..... J. Bergman
Register F. K. Fassett
Register J. O. Morris
Rheostat W. Baxter, Jr
Riveter set, Pneumatic W. H. Van Sickle
Roentgen ray tube 2 pats E. Thomson
Rolling mill guide W. Buntton

Rolling or metal tubes. Automatic mechanism for step by step..... R. Laybourne et al
 Roof carline..... G. B. Maltby
 Rooms. Apparatus for protecting the audience parts of..... B. A. Stevens
 Rotary engine..... A. M. Krueger
 Rotary engine..... A. L. Estes
 Roundabout..... F. S. di Vito
 Rubbing wheel..... G. L. Badger
 Saddle. Harness..... J. A. Kramer
 Safety pin..... H. A. Heineman
 Sampler..... F. T. Snyder
 Sand blast apparatus..... J. E. Mathewson
 Sand blast apparatus..... J. D. Murray
 Sash and screen fastener. Storm A. B. Graham
 Sash stop and lock combined. Window..... R. L. Riley
 Saw. Power hack..... A. W. Cash
 Saw tooth sharpener..... T. L. Wallace et al
 Scraper. Wheeled..... C. H. Sawyer
 Screw driver..... W. Rundquist
 Sealing jars or packages. Means for and method of..... W. W. Vaughan
 Sealing machine. Envelop..... L. Madas
 Seeder. Clover and grass..... A. M. Highsmith
 Seeding machine..... 2 pats. A. Lindgren
 Separator..... F. F. Vater
 Separator..... C. W. Colvin
 Sewing machine. Filled bag..... M. C. Ellison
 Sewing machine thread controlling mechanism..... S. Borton
 Sewing machine work receiving attachment..... C. I. Latshaw
 Shaft. Vehicle..... A. Bever
 Shaker hanger..... 2 pats. J. C. Winder
 Shank stiffener..... H. F. Crawford
 Shearing and shaping machine..... G. Hall
 Sheet coating machine..... E. Williams
 Shirt waist holder..... C. Spies
 Shoe fastening..... E. M. Dickson
 Shoe fastening device..... G. E. Peirce
 Show case..... A. Jaeger
 Sidewalk roughening tool..... B. F. Thies
 Sieve. Adjustable mesh..... K. H. Knudsvig
 Sign..... A. J. Bradley
 Sign. Advertising..... W. A. Kress
 Sign. Electrically-controlled monogram..... M. Du Perow
 Signaling system. Automatic electrical..... 3 pats. F. S. Holmes
 Shirt hanger..... J. Nagely
 Snatch block..... W. Houghton
 Snow plow and road making machine..... F. G. King
 Soldering iron..... P. Gilbert
 Sole. Slipper..... J. D. Cooper et al
 Sound records, &c. Production of..... T. H. Macdonald
 Sound vibrations in water. Means for producing..... J. B. Mittet et al
 Soundings. Apparatus for taking..... P. O'Neill
 Sower. Fertilizer..... J. Willson
 Speed indicator..... L. F. W. Pahl
 Spindles. Bobbin clutching means for rotatable..... J. C. Edwards
 Spindles. Bobbin clutching means for rotatable..... H. Lawrence
 Spinning and twisting apparatus. Ring..... G. O. Draper
 Spinning spindle bobbin clutching means..... H. Lawrence
 Sprayer..... L. Coster
 Square and plumb bob. Combined A. K. Shoop
 Stamp mill..... A. P. Granger
 Stamps, tickets, &c. Mechanism for dispensing..... M. Sielaff
 Starch. Apparatus for making soluble..... W. Browning et al
 Station indicator..... H. G. Canfield
 Steam boiler..... 2 pats. D. Best
 Steam engine..... F. W. Gaskin
 Steam trap..... W. M. Still
 Steam trap..... C. E. Huxley
 Steam trap..... F. Knackstedt
 Sterilizer..... R. Allen
 Stone, marble, &c. Polishing and finishing lime..... C. H. Weigelt
 Stop motion mechanism for textile machinery. Electrical..... J. B. Whitney
 Storage battery..... E. A. Sperry
 Storage battery..... C. B. Morgan
 Stove..... J. Goldstein
 Stove. Heating..... A. A. Little
 Stove or furnace fire pot..... H. J. Hough
 Stovepipe ventilator..... F. W. Farrington et al
 Street or station indicator for street railway cars, &c. Automatic..... A. Garabedian
 Sucker rod joint..... E. B. Campbell
 Sulfuric anhydride. Apparatus for making..... R. Knietzsch
 Support. Adjustable..... E. T. Palmenberg
 Surface gage. Indicating..... W. H. Reiser
 Suspender attachment..... H. Tartsch
 Suspender cast off..... H. G. Macmillan
 Suspender hook..... I. F. Rowley
 Switch operating and locking device..... J. Hart
 Switch operating device. Automatic..... D. Pamp
 Table lock. Pedestal..... E. Tyden
 Table locking device..... G. A. Davis
 Tank signal..... B. F. Jackson
 Telephone call bells. Electrical alarm for..... J. W. Fouché
 Telephone time metering charge..... L. Kitsee
 Telescope support..... G. N. Saegmuller
 Thermo electric generator..... 2 pats. M. J. Wightman
 Tire. Pneumatic..... C. H. Pierce
 Tire with fastening strips. Solid elastic..... H. G. Fiske
 Tobacco smoking pipe..... A. W. Clarke
 Tongue switch..... I. K. Dixon
 Tooth. Artificial..... C. A. Davis
 Toothpick machine..... W. F. Hutchinson
 Toy carousel..... J. V. Fuller
 Toy rapid fire gun..... J. Leopold et al
 Track cleaner..... F. R. Larrabee
 Track sander..... J. H. Watters
 Track structure..... L. Steinberger
 Tramway. Automatic aerial wire rope..... H. J. Leschen
 Transport apparatus..... L. Streuli
 Trap and waste outlet for set tubs, &c..... J. Holmes
 Triturator..... I. S. Goldman
 Trolley..... W. R. Cooper
 Trolley harp..... C. R. Ralph
 Trolley pole contact..... J. J. Lacknor et al
 Trolley wheel..... J. J. Bouchard
 Trolley wire splice and support. Combined..... A. B. Allison

Truck. Car..... J. Green
 Trunk fastening..... T. J. Livsie
 Turning curved surfaces. Apparatus for..... M. Barr
 Turning tool..... J. Hartness
 Turret operating mechanism. Electric..... O. P. Loomis
 Twine holder..... L. M. Parrish
 Twine holder and lifter..... E. S. Alderman
 Type writer..... F. E. Heath
 Type writer..... C. L. Reamer
 Type writer key and type bar mechanism..... J. Alexander
 Type writing machine..... B. A. Brooks
 Type writing machine type linking apparatus..... 2 pats. J. S. Southerden
 Umbrella. Folding..... E. C. Miller
 Uncoupling device..... P. P. & I. H. Boese
 Vacuum apparatus..... M. Ekenberg
 Vacuum tubes. Exciting..... H. Lemp
 Valve..... V. Martin
 Valve..... G. W. Hayden
 Valve..... J. T. & G. W. Hayden
 Valve..... J. Mann, Sr
 Valve..... C. P. Geritz
 Valve. Fluid pressure engine slide..... S. E. Webbe
 Valve for compressed air water elevators..... J. L. Latta et al
 Valve for water heaters. Hydrosiphon..... J. A. Stevenson
 Valve. Safety..... J. Powell
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 Vehicle brake. Automatic..... E. E. Krenzel
 Vehicle frame..... N. T. Harrington
 Vehicle propelling mechanism..... J. R. Knapp
 Vehicle running gear..... R. H. Wight
 Vehicle running gear. Motor..... E. B. W. Reichel
 Vehicle speed indicating attachment..... O. F. Hakes
 Vehicle storm shield..... I. J. Russell, Jr
 Vehicle wheel..... H. W. Adams, Jr
 Vehicles, &c. Controlling device for motor..... C. W. Russell
 Vending machine..... M. Sielaff
 Vending machine. Coin operated. C. T. Frantz
 Ventilator..... W. Edwards
 Vessel. Metallic..... C. L. Coffin
 Wagon. Pump..... J. A. Love
 Wagon elevator attachment. Farm..... O. S. Anderson
 Wagon side board fastener..... M. Lenhart
 Wall construction..... F. E. Kidder
 Washing machine..... C. C. Meyer
 Water cooler base..... A. Major
 Water gage..... E. C. Jordan
 Water gate opening or closing means..... A. J. Collier
 Water heating attachment..... L. S. Frost
 Water purifying apparatus..... C. L. Kennicott
 Water tank heater..... A. S. Allendorph
 Weather boarding apparatus..... W. Spear
 Weather strip..... W. H. Taylor
 Weighing truck. Automatic..... W. M. Wade
 Well drill. Expandable..... I. R. Griffith
 Wheel..... D. P. McQueen
 Wheel rims. Machine for bending trough section metallic..... S. T. Richardson et al
 Wheels. Slip preventing device for rubber tired..... M. J. Kelly
 Winch. Portable electric..... J. Heywood
 Wind wheel..... E. Pavon y Moraleda
 Windmill..... F. J. Kepler
 Wood. Deriving products from..... C. M. Dobson
 Wood ornamenting apparatus..... W. W. O. F. & E. C. Dittmar
 Wooden article and producing same Ornamental..... W. W. E. C. & O. F. Dittmar
 Woodworking machine..... E. Rawson
 Woven fabric forming apparatus..... T. Penlarge
 Wrench..... E. Fisher
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DESIGNS.

Chafing dish stand..... A. R. Pritchard
 Christmas tree ornament..... W. F. Simon
 Cullinary vessel..... F. H. Griswold
 Glass bowl..... A. J. Sanford
 Plate or similar article..... J. Williamson
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 Anchor. Earth..... G. H. Miller
 Animal trap..... S. S. Elder
 Animal trap..... J. R. Emery
 Animal trap..... J. M. Wilkinson
 Apparel. Wearing..... A. Tishler
 Apparel. Wearing..... J. Rathschuler
 Armor shield..... B. Behr
 Auger. Adjustable earth..... G. Stevenson
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 Axle. Vehicle..... M. E. Thomas
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 Basin for sink outlets. Catch..... H. Rohschon
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 Bearing. Roller..... H. A. Lockwood
 Bed bottom. Spring..... F. Karr
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 Bed. Folding..... A. W. Pyle
 Bed spring..... E. Jewell
 Bedstead guard..... C. H. Wright
 Bed top and puller..... E. O. Cady
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 Blast charger..... J. Lord

Bloom shears..... C. L. Taylor
 Bobbin. Shuttle..... A. G. Lamb
 Bodkin..... M. L. Hotchkiss
 Boiler tube cleaner..... J. A. Sagerdahl
 Boilers by exhaust steam. System of heating..... J. Nadrowski
 Bolt cutter..... C. K. Lassiter
 Book holder..... L. Block
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 Box..... J. Dobos
 Brake beam clamp..... E. C. Totten
 Brake mechanism. Automatic..... A. E. Norris
 Bread making apparatus..... E. D. Lynds
 Brush..... S. R. Boon
 Brush..... J. McDermott
 Building block..... S. O. Hawkins
 Building construction..... J. Wilts
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 Butter cutter..... A. C. Hummer
 Button. Lapel..... G. S. Engle
 Cake beater..... M. A. Ritter
 Cake dresser. Rotary..... R. F. Stephenson
 Calculator..... H. M. Seitzinger
 Calendar..... R. Illing
 Camera. Photographic..... W. H. Cooley
 Cameras. Lens-support for ground glasses on..... H. T. Donnan
 Can capping machine..... C. B. McDonald
 Can cooling apparatus..... A. E. Hopkins et al
 Canopy frame coupling..... I. E. Palmer
 Capsule decapping, filling and recapping machine..... A. K. Carter
 Car automatic stop. Cable..... A. M. Green
 Car bolster..... R. V. Sage
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 Car coupling..... R. Reardon
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 Car end stake..... C. A. Lindstrom
 Car fender. Retractable..... C. D. Pidgeon
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 Car. Railway..... M. A. Garrett
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 Car replacer..... W. P. Britain
 Car underframing..... H. C. Williamson et al
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 Cars. System of upper framing for railway..... G. W. Scott
 Carburetor..... H. Marshall
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 Carbureting apparatus. Air..... H. Marshall
 Carpet stretcher..... J. J. Moore
 Carpet wire and cutter..... A. Price
 Carton cabinet..... F. M. Thorpe
 Cartridge. Flash powder..... I. G. McColl
 Caster..... Z. J. Quinn
 Caster wheel..... W. A. Henderson
 Casting and hardening of metal for armor plates, &c. Direct..... W. E. Everette
 Cellulose acetate..... 2 pats. W. H. Walker
 Cement..... F. Suter
 Chain jack..... I. M. Butcher
 Chain link. Split..... W. T. Laughlin
 Checks. System of protecting bank..... S. M. & M. L. Trapp
 Chimney base protector..... G. W. Lewis
 Chloral. Continuously producing and rectifying..... J. A. Besson
 Christmas tree holder and display stand..... J. A. Rompel
 Chuck. Milling..... J. & W. R. Thomas
 Cigar case..... G. G. Macdonald
 Cigar cutter..... M. Stratton, Jr
 Cigar lighter. Electric..... J. Waters et al
 Cigar mold compressing and opening device..... H. M. Dalton
 Circuit closing device..... H. T. Johnson
 Clay working machinery..... R. Buhler
 Clothes drier..... T. P. Cavanaugh
 Coaster..... N. Campbell
 Coasting. Composition..... A. H. Stillwagon
 Cock. Rail..... A. F. Morency
 Cock. Gage..... A. I. Fink, Jr
 Coffee. Cleaning..... W. A. Hastings et al
 Coin receptacle..... J. W. Stephens
 Coke quenching and bleaching apparatus..... E. A. Moore
 Colander. Fruit..... L. P. Castle
 Collar fastening device..... E. Sibbald
 Collar turning apparatus..... J. M. Beiermeister
 Combining machine attachment..... A. A. Sack
 Combs. Traverse mechanism for warper..... A. E. Rhoades
 Compasses. Drawing..... D. W. Macdonald
 Composite post..... I. L. Landis
 Composite post..... J. J. Luck
 Composition of matter..... L. Champowich
 Conduit threading machine..... E. U. Mack
 Confectionery machine..... W. S. Sampson
 Conveyor..... N. H. Larry
 Conveyor..... D. E. Hughes
 Conveyor..... G. Carlson
 Cord tip..... J. R. Barrett
 Cord substitutes. Making..... F. H. Brooks
 Corn husking machine..... G. Peters
 Corn or bunion shield..... I. A. George
 Corset..... E. Savoye
 Counter fixture..... A. W. Frey
 Counter. Profit sharing sales..... H. Hepfer
 Counter. Sales..... J. A. Flesch
 Coupon system. Interchange of trade..... L. N. Singley
 Crate. Collapsible..... E. A. Keck
 Crate. Folding..... E. M. Averill
 Cross arm brace..... F. R. Cook
 Cultivator..... M. G. Graham
 Curling tongs support..... L. M. Kate
 Current motor or water wheel..... J. S. Mathews
 Cut out. Drop circuit..... F. J. Russell
 Damper regulator..... E. K. Hutchinson
 Damper regulator. Automatic..... J. F. Wood
 Derrick..... J. H. Fox
 Die stock..... J. I. Delephant
 Directory. Indexed mechanical G W Maxwell
 Display receptacle for objects immersed in preservative liquids..... M. J. Greenman et al
 Distilling and preserving apparatus. Wood..... F. S. Davis
 Distilling liquids..... W. E. Garrigues
 Ditching machine..... J. H. Sylvestersen

Door, &c., attachment. Screen..... O. J. Coppins
 Door catch..... C. A. Borein
 Door fastener..... D. Wilde
 Door, gate, &c..... W. R. & R. Pitt
 Door hanger..... T. C. Prouty
 Doorways. Means for excluding drafts from open..... T. Van Kannel
 Doubling or other textile machines. Hook for drop wires on..... J. R. Mitchell
 Draft evener..... H. & J. H. Thiedemann
 Draft rigging..... L. A. Hoerr
 Dredging device..... J. L. Searfoss
 Dress stand figure..... J. Walker
 Drying apparatus..... G. D. Harris
 Drill ball bearing. Disk..... O. S. Bakke
 Drilling machinery..... C. E. Willey
 Driving connection..... E. A. Johnston
 Drum and cymbal attachment. Bass..... J. P. Stanton
 Drum or winch apparatus. Power operated..... A. E. Norris
 Dust guard..... 3 pats. E. Denegre
 Dyeing, &c. Apparatus for..... O. Venter
 Ear phone..... D. E. Smith
 Edge runner..... W. A. Merralls
 Electric generator brush holder..... I. Deutsch
 Electric heater. Flexible..... S. S. Wales
 Electric illuminating arrangement for railway vehicles..... F. W. Schneider
 Electric interrupter for high frequency currents..... G. E. Johnson
 Electric signal..... F. H. Gray
 Electrical circuit protective device..... F. B. Cook
 Electrical connection..... F. J. Russell
 Electrical coupling..... F. J. Sprague
 Electrically wound mechanism. Liquid contact chamber for..... P. L. Clark
 Electrolytic apparatus..... A. Brichaux
 Electrothermic and vacuum appliance..... C. C. F. Nieschang
 Enameling kiln..... J. S. Jobe
 Enameling metal..... C. F. Pfalzgraf
 Engine leveling device. Traction..... F. & W. Holets
 Excavating bucket..... F. M. Ireland
 Exhaust head..... F. M. Overholt
 Explosive engine..... R. Miller
 Expressing machine..... R. Oppenheim
 Fat and making same. Solidified hydrogenized..... H. Winternitz
 Faucet..... G. L. Dawley
 Fence knot or tie. Wire..... G. S. Tiffany
 Fence post..... E. Bruley
 Fence post. Metallic..... J. W. Altmeyer
 Fence post. Metallic..... G. B. Greer
 Fence wire fastening device..... E. Wheeler
 File. Card index..... J. H. Van Horn
 File. Paper..... P. H. Yawman
 Filter. Water..... J. H. Cox
 Finger ring..... C. Schmidt
 Fire alarm. Automatic..... J. W. Griffin
 Fire escape..... J. Hamilton et al
 Fire extinguisher. Chemical..... C. Nuhling
 Fire extinguishing device. Automatic..... 2 pats. J. Galvin
 Firearm safety device..... O. G. Vold
 Fireproof construction for floors, ceilings, &c..... A. Forrester
 Fish cleaning machine..... J. Kellington
 Fishing tackle..... G. K. Hurlbut
 Fixing box..... H. D. Chichester
 Flower holder..... W. Temblett et al
 Fluid elevator..... A. Brown
 Folding stand..... A. S. Marten
 Food and preparing same. Article of..... E. T. Williams
 Foundation..... E. C. Hodges
 Freight handling apparatus..... F. B. Hewitt
 Fuel and making same. Artificial..... M. F. Maginnis
 Fuel. Manufacture of artificial J. J. Shedlock
 Furnace..... A. C. Calkins
 Furnace for reducing and smelting nickel oxides..... R. R. Maffett
 Furnace grate..... F. Girtanner et al
 Furnace hoisting apparatus. Blast..... H. Heffrin
 Garment hook..... W. Hipsley
 Gas burner valve operating device C W Currier
 Gas condensers. Conduit system for connecting..... E. F. Lloyd
 Gas hose coupling..... H. Ackermann
 Gas lighting apparatus..... D. J. Clark
 Gas machine. Acetylene E. F. & E. P. Clough
 Gas manufacturing apparatus..... C. R. Ingham
 Gas producer charger..... E. H. Carroll
 Gas. Recording calorimeter for F. N. Speller
 Gas scrubber..... A. Steinbart
 Gas tank closure..... E. F. Lloyd
 Gases. Apparatus for vaporizing and regulating liquefied..... G. B. Fraley
 Gate..... I. Granger
 Gate fastener..... E. F. Hopp
 Gear. Catch and escapement..... J. Rietie
 Gearing..... W. H. Hultgren
 Glass. Device for carrying heated R. W. Blaze
 Glass melting and shaping device M. J. Owens
 Glass. Pot furnace for melting W. T. Nicholls
 Glass tray..... A. Lange
 Glass. Working..... A. Swan
 Glove..... O. W. Noll
 Glove fastener..... E. W. Dyke
 Glycerin from spent soap lyes. Recovering..... W. E. Garrigues
 Governor. Pumping engine..... C. P. McMullen
 Grass collector. Dumping..... J. H. Hirt
 Grater. Nutmeg..... J. T. Welke
 Grinding machine..... E. Stead
 Guns. Shield mounting for quick firing..... J. A. Wilson
 Hammock frame or support..... W. C. Poles
 Harvester weight sustaining and adjusting means..... M. A. Grove
 Hat fastening means..... C. M. McConnell
 Hay rack..... W. H. Giese
 Hide treating machine..... H. F. Dougherty
 Hinge joint..... W. H. Wise
 Holder..... A. A. Low
 Hoop pointing and lapping machine..... A. F. Ward
 Horn like substance and producing same. Elastic..... L. Lederer
 Horseshoe..... W. H. Lake
 Hose coupling..... A. W. Nunn
 Hose drier..... C. M. Bowman
 Hydraulic press..... E. G. Budd
 Implement attachment..... C. A. Adams
 Innersole..... L. H. Vogel
 Instantaneous heater..... W. Wishart
 Insulated rail joint..... C. J. Buck
 Insulator. Fibrous material..... R. Andlauer

Jacquard apparatus.....B. S. Smith
Journal box.....C. Williams
Keys, &c. Dies for making.....L. W. Gates
Keys. Making cold forged.....L. W. Gates
Kiins. Car for tunnel.....A. A. Gery
Knitting machine.....W. T. Barratt et al
Knitting machine. Circular.....H. A. Houseman
Knitting machine cloth wheel.....A. A. Bailey
Knitting machine. Straight bar.....A. Woller
Lacing hook.....W. B. Estes
Lacing hook setting machine.....I. F. Peck
Lamp. Alcohol.....G. E. Savage et al
Lamp base. Incandescent.....A. Swan
Lamp bases. Machine for making incandescent electric.....A. Swan
Lamp burner.....W. A. Painter
Lamp hanger. Electric arc.....W. J. Jones
Lamp holder. Electric incandescent.....P. Kleber
Leather. Making.....W. Macmillan
Leather staking machine.....S. C. Bond
Leer.....M. J. Owens
Leer filling machine.....M. J. Owens
Locomotive safety attachment.....C. W. S. Turner
Loom box motion mechanism.....F. A. Meyers
Loom split shed mechanism.....H. P. Wirz
Loom stop motion.....M. O. Steere
Loom tape winder. Tape.....P. Hesse
Loom temple.....A. E. Benson
Loom warp stop motion.....J. H. Foster
Loom. Weft replenishing.....E. A. Thissell
Lustrous composition.....J. Heineman
Mail box.....J. W. Whalen
Manhole terminal for conduit sections.....G. M. Gest
Manifolding means.....C. E. Richardson
Match box.....A. Tarner
Measure. Foot or last.....H. F. Goodrich
Measured quantities. Apparatus for delivering.....A. A. Kelly
Measuring instrument. Combination.....W. P. Phenix
Measuring machine. Cloth.....D. A. Albright
Meat salting apparatus.....L. Peter
Metal can.....J. J. Hickman
Metal ware. Enameled.....T. M. Lunan
Metalurgical process.....M. P. Boss
Milk server.....C. C. Bennett
Milk feed regulator.....J. Maurice
Mine shaft safety device.....N. W. Dickerson
Miner's squib.....E. C. Owens
Moistener for gummed surfaces.....J. D. Browne
Money pouch.....H. Harms
Mop and wringer. Combined.....H. H. Freer et al
Motion. Mechanism for changing rotary into reciprocating.....E. Rivett
Mower sprinkling attachment.....H. Sorensen
Muffler. Neck.....J. C. Scott
Music leaf turner.....N. P. Jensen
Musical instrument.....J. C. Deagan
Musical instrument variation register. Automatic.....M. Clark
Night stand. Hygienic.....N. Faucon
Numbering machine.....G. H. Miller
Nut Axle.....J. Berry
Nut lock.....H. L. Finley et al
Oil and water separator.....J. C. Gaskill
Oiler. Pocket A. F. & W. Meisselbach, Jr. et al
Oiling device. Refrigerating machine.....S. A. Palmer
Optical and mathematical instrument.....P. A. Geier
Ore grinding mill.....C. C. Pratt
Ore washing machine.....G. Seberg
Packing. Metallic.....F. F. Swain
Packing. Metallic.....2 pats. H. Thompson
Packing. Metallic ring.....J. C. Paine
Pad holder.....L. W. French et al
Paper or the like. Machine for slitting sheets of.....L. H. Rice
Paper roll making machine.....T. Gillard
Paper. Safety commercial.....J. Rowan
Paper weight and calendar. Combined.....F. G. Post
Papier mache. Manufacture of objects of.....R. G. Schmitt
Pea vine cutter.....J. B. Klamfoth
Perambulator.....L. Perotti
Photographic mount.....E. S. Cheney
Photographic process for the reproduction of plastic objects.....C. Baese
Piano action.....U. G. Clark
Piano detachable music rack.....M. M. Moreland
Pin safety catch.....A. M. Remington
Pipe bending apparatus.....L. H. Broinkman
Pipe cleaner.....P. Wolf
Pipe coupling.....W. S. Houser
Pipe threading device.....W. H. Morgan
Pipes. Manufacture of lapweld.....R. C. Crawford et al
Piston.....J. S. Ladd
Piston rod support.....W. C. Trout
Planter. Corn.....R. Thompson
Pleasure wheel.....Q. Stubbs
Plow.....J. B. Hill et al
Plow.....E. B. Winters
Plow display stand.....W. N. Martin
Plow. Ditch.....J. Robertson
Plow wheel fender. Sulky or gang H. A. Smith
Plug. Separable attachment.....H. Hubbell
Poke. Animal.....W. L. F. Malaby
Portable engine.....H. White
Post.....W. K. Given
Posts. Wire fastener for metallic J. E. Tapley
Post card exhibitor.....J. C. Richard
Postmarking and stamp canceling machine.....G. W. Hey
Potato digger.....D. Y. Hallock
Powder canister. Tooth.....A. de Khotinsky
Printing machine.....J. White
Printing machine.....J. S. Duncan
Printing machine. Multicolor.....E. H. Cottrell
Printing plates. Manufacture of E. A. Neben
Printing press sheet transferring device.....G. P. Fenner
Pulley. Sheet metal.....R. H. Bowen
Pump. Combined compression and exhaust.....M. A. Yeakley
Pump piston.....G. M. Cote et al
Pumping lever.....J. E. Hudson
Punching bag.....J. G. Keith
Purse. Coin or change.....J. M. Kerst et al
Push down holder.....E. Tompkins
Puzzle.....J. S. Pinnell
Rail.....H. B. Sutliff
Rail joint.....J. W. Schlegel
Rail joint.....E. A. Barry
Rail joint fastener.....J. A. Gossard, Jr

Railway rails. Connecting rail for alining.....A. H. Mulliken
Railway signal system.....O. J. Lee et al
Railway signaling apparatus.....C. W. S. Turner
Railway signaling apparatus. Automatic.....C. G. Mardorf
Railway superstructures. Apparatus for controlling movable parts of.....F. L. Dodgson
Railway switching mechanism. Street.....W. I. Bell
Railway tie. Metallic.....L. C. Mayes
Railway tie. Metallic.....C. F. Luffkin
Railway traffic controlling apparatus.....C. J. Coleman
Railways. Automatic interlocking signal system for.....B. C. Rowell
Razor safety device.....A. J. H. Lefebvre
Refrigerator.....L. Perotti
Retort.....J. C. Mallonee
Rheostat.....M. Waddell
Rotary engine.....E. Anderson et al
Rotary engine.....W. Beaumont
Route indicator.....T. E. Knauss
Rubber. Reclaiming and regenerating.....L. T. Petersen
Ruling machine.....H. C. Crozier
Saddle metal seal plate. Riding.....H. M. Auerwald
Sash closing device.....C. Rupp
Sash fastener.....C. G. Seaman
Sash fastener. Automatic.....D. G. Saunders, Jr
Sash holder. Window.....G. G. Stone
Sash lock.....H. B. Hughes
Sash lock.....P. J. Hogan
Saw. Drag.....E. E. Thompson
Saw handle.....A. E. Townsend
Scale. Price.....S. W. Finch
Scarfling and bending device with transfer table.....J. F. Boax
Seal. Car.....E. B. Williams et al
Sealing vessels. Method of and means for.....J. M. Hicks
Sectional case.....A. E. Stenshaug
Seed huller. Cotton.....D. A. Tompkins
Separator.....2 pats. A. J. Greenaway
Sewing machine. Blindstitching.....C. F. Filor
Sewing machine. 3 pats.....M. T. Denne
Shade. Adjustable.....W. H. Jewett
Shade fixture for windows curved transversely.....R. Barkhurst
Shaft collar.....G. H. & R. C. Rich
Shaft holder.....W. Dickie
Shoe polisher.....F. A. Cutter
Shoe upper fastener.....W. E. Ellis
Shoes. Assembling parts of.....C. W. King
Signaling apparatus. Electrically operated block.....C. W. S. Turner
Siphon.....J. F. Harrigan
Sleigh. Spring.....W. C. Prouty
Slimes. Filtering.....H. R. Cassel
Smoke consumer.....W. Wiley
Snoring. Device for preventing S. A. Moulton
Soldering machine. Can end.....A. Lotz
Sound records. Duplicating G. A. Manwaring
Spark plug.....E. B. Jacobson
Spike.....J. B. Anderson
Spinning machine stop motion.....M. T. Bentley
Spraying apparatus.....W. H. Heard
Spring cushion.....E. Denegre
Stalk cutter.....H. F. Hinton
Stalk cutter, root extractor and fertilizer distributor. Combined.....E. P. Hollis
Stamp. Hand.....H. M. Kendrick
Stamp stem and tappet attachment.....W. Reine
Steam boiler.....M. Sherman
Steam engine.....2 pats. D. E. Johnson
Steam engine.....T. W. Mitchell
Steam generator.....A. P. Dodge
Steam superheater.....N. Notkin
Steam trap.....J. Campbell
Steering apparatus. Ship.....J. Peterson
Steering gear and rudder indicator.....W. Weber
Stereoscope. Collapsible.....S. Herman
Stock spraying machine. Live G. T. Seabury
Stone holder.....P. H. Farrell
Stone molding machine. Artificial.....G. W. Dy Arman
Stove or furnace grate.....J. W. Piper
Stove tank. Gasolene.....A. J. Blackford
Surveyors' instruments. Initial reading indicator for.....R. Cox
Syringe. Vaginal.....E. E. Hall
Tailor's block.....F. L. McMullen
Talking machine.....N. L. Lewis
Talking machine cabinet.....E. R. Johnson
Tap. Automatic.....C. Lewin
Tapping machine.....G. A. Hoffman
Teat cup. Pneumatic.....A. Gillies
Telegraphic transmitter.....A. C. Gilmore
Telephone pay station toll collecting appliance.....F. R. McBerty
Telephone switchboard signaling apparatus.....F. R. McBerty
Telephone system. Party line.....F. Vollmer
Telephone systems. Attachment for party line.....W. A. Shackelford
Telephone trunk line apparatus E. H. Smythe
Testing machine.....W. J. Tretch
Thermal protector. Self soldering F. B. Cook
Thill coupling.....L. J. Dillon
Threshing machine band cutter.....O. A. Butterfield
Tide and draft indicator.....J. Gedeon et al
Tile. Illuminating.....P. H. Jackson
Time detector. Watchman's.....J. Schlenker
Tool. Pneumatic.....W. H. Soley
Tooth cleaner.....J. E. Keefe
Torch.....F. M. Baker
Toy. Optical.....W. H. Zimmerman
Track clearer and divider.....J. N. Whittinghill
Trimming fabric.....B. Branner
Trolley.....J. W. Rockafellow
Trolley guard for electric railways.....J. Kress
Trousers stretcher and creaser E. G. O'Connor
Truck.....J. Moore
Truck.....H. C. Harrington et al
Truck. Car.....R. P. Lamont
Truck. Car.....H. M. Pfleger et al
Truck for handling metal.....E. W. Lindquist
Truck. Wrought metal railway car.....2 pats. E. Kaylor
Trunk corner guard or protector W. G. Fowler
Tube lifting device for conveying troughs.....J. J. Boax
Tubing. Making lapweld.....P. Patterson
Tunnel construction. Shield.....W. I. Aims
Tunnels. Constructing.....2 pats. E. W. Moir
Turbine nozzle. Sectional.....C. G. Curtis
Turbine. Steam.....C. E. Winterros
Type writing machine.....H. W. Merritt et al

Type casting and setting machine leading attachment.....S. Drummond et al
Type writing machine.....E. Yates et al
Type writing machine aliner F. H. Armstrong
Type writing machine carriage feeding mechanism.....F. H. Armstrong
Type writing machine line spacing mechanism.....F. H. Armstrong
Type writing machine paper feeding mechanism.....F. H. Armstrong
Type writing machine platen shifting mechanism.....F. H. Armstrong
Type writing machine ribbon feeding mechanism.....F. H. Armstrong
Universal union or coupling.....F. McCarthy
Valve.....W. Richards
Valve device for air brakes. Simultaneous.....J. W. Cloud
Valve gear. Explosive engine.....A. Bougault
Valve. Pressure regulating.....G. G. Smith
Valve. Steam engine cut off.....F. J. Waters
Vehicle drop brake.....C. A. Miller
Vehicle spring gear.....B. F. Taylor
Vehicle traction attachment.....A. W. Herrick
Vehicle wheel.....H. W. Adams, Jr
Vehicle wheel and axle.....M. Conrad
Vehicles. Speed control of electrically propelled.....J. S. Raworth
Vending machine.....W. Diebel
Ventilator.....D. Robinson
Vessels. Device for discharging barges, lighters or other cargo.....R. & J. Morley
Vignetter.....J. H. Smith
Vise.....E. Clark
Vise.....R. G. Fleischmann
Wagon.....S. L. Mitchell
Wagon brake.....O. C. Ostrum
Washboiler handle.....T. L. Ferrall
Washing machine.....R. Neugeboren
Washing machine motor.....G. E. Averill
Water burning apparatus.....S. S. Muth
Water meter.....E. J. Hoff
Water pipe, &c.....P. E. Fisher
Water purifier.....D. N. Baxter
Water tube boiler.....M. T. Goss
Water tube boiler.....J. M. Coleman
Watering fountain. Fowl.....R. L. Widney
Waterway. Pleasure.....A. Pusterla
Wave motor.....G. M. Lynch
Weather strip.....J. E. Scott
Weed puller.....T. H. Tregellas
Wheel.....F. J. Pagot
Windmill.....A. Fornander
Window cleaner.....A. J. Beaver
Window cleaner and polisher.....C. L. Page
Window. Show case.....F. J. Osius
Window spring.....C. E. Avery
Window. Teller's.....E. Liberty
Wires. Die for tying intersecting.....W. H. Shierson
Work holder.....A. Le Blanc
Wrench.....N. F. Turner
Wrench.....C. Conrad
Yoke attachment. Neck.....E. H. Miller et al

DESIGNS.

Automobile body.....E. R. Thomas et al
Brushes. Back for.....A. E. Hathaway
Candlestick.....A. H. Heisey
Fabric. Textile.....2 pats. J. W. Kemp
Flagon. Alcohol.....S. Sternau et al
Match box or similar article.....S. A. Keller
Mirrors. Back for.....A. E. Hathaway
Nail files, paper knives or similar articles. Handle for.....A. E. Hathaway
Powder receptacle. Toilet.....S. M. Colgate
Radiador section.....A. J. Pieszak
Screw driver.....W. S. Ward
Spoons, forks, or similar article. Handle for.....H. L. Wallace

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MECHANICAL PATENTS

Advertising blotter.....N. L. Bassett
Air brake.....J. C. Clyde
Air brake. Compressed.....G. E. Honplain
Air brake coupling. Automatic.....H. O. Beale
Alcohol and aldehyde. Making.....H. S. Blackmore
Alternator safety coupling device.....E. S. Baker et al
Aluminium, &c. Reducing.....H. S. Blackmore
Ammunition jacket.....J. W. Righton
Amusement apparatus.....J. H. Maguire
Animal trap.....J. W. Collins
Aseptic cartridge, &c.....W. E. Ranz
Auger or drill for boring rock, &c. E. Cachelin
Automatic brake.....M. A. Fillmore
Automobile.....S. C. Rockman
Automobile attachment.....J. B. Mott
Automobile driving gear.....G. C. Cannon
Awning roller chain box.....S. M. Hauser
Backing sheet or filing wrapper.....C. O. C. Leigh
Baby jumper.....R. Gaines
Bag.....W. P. Flowers
Band machine head.....C. A. Cline
Bank and clock. Combined savings.....R. P. Wessels
Basin receiving head. Catch.....A. W. Kurz
Bearing. Ball.....A. A. Riebe
Bed. Convertible.....M. L. Evans
Bedclothing supporter.....J. P. Buckley
Bedstead. Folding.....A. Allendy
Belt dressing.....G. Schliebe
Bending die.....J. H. Barr
Bending machine.....J. Arber
Beverage.....E. M. Roberts
Bicycle holder or support.....J. Speir
Billard cue rest.....E. Blackburn
Binder.....H. P. Jones
Binder. Loose leaf.....G. F. Watt
Binder. Temporary.....H. E. Wendland
Binder. Transfer.....T. R. Eddy
Binding or trussing mechanism. Sheaf.....D. Roberts et al
Bisulfite liquor. Apparatus for preparing.....P. Drewsen et al
Block.....T. R. Ferrall
Bluing device.....A. Acheson
Boiler.....E. T. Copeland
Boiler furnace. Steam.....A. Q. Nash
Book finishing machine.....F. A. Steele et al
Book. Posting proof and balance.....A. H. Mooser et al
Book support.....B. R. Green
Boring bar tool. Adjustable.....J. Johnson

Bottle.....C. King
Bottle filling machine.....P. M. Wise
Bottle forming implement.....H. Coale et al
Bottle. Non-refillable.....C. Coleman
Bottle. Non-refillable.....B. T. Delafield
Bottle. Non-refillable.....J. S. Miller
Bottle. Non-refillable.....L. Lecompte
Bottle. Non-refillable.....C. H. Conlon
Bottle. Non-refillable.....P. Schmolck
Bottle or pad. Flexible water.....W. A. Galloway
Bowling alley. Parlor.....R. E. Philipp
Bowling alley score sheet.....G. W. Bennethum
Box and wallet. Combined.....E. McDonald
Boxes from paper and for filling same with cigarettes, &c. Machine for making.....E. T. Pollard
Brake mechanism.....C. K. Pickles
Brake shoe. Roller bearing.....J. N. McNeace
Brick kiln.....J. Sonka et al
Brick or stone. Making artificial.....L. F. Kwiatkowski
Buckle.....N. Johnson et al
Building block.....P. Dierlamm
Burglar alarm system. Electric.....C. Coleman
Burner bowl and valve.....A. B. Hemingway
Button. Collar.....E. J. Baril
Camera.....J. Goddard
Camera brace.....J. Goddard
Camera. Photographic.....C. Bornmann
Cameras. Magazine plate-changing apparatus for photographic.....A. A. Brooks
Can top.....C. C. Woods
Cane or corn cutter.....J. B. Gaussiran
Car construction.....G. I. King
Car construction.....J. H. Graham
Car curtain.....C. K. Pickles
Car curtain attachment. Railway.....C. K. Pickles
Car curtain rod.....C. K. Pickles
Car draft appliance. Railway.....W. H. Miner
Car draft rigging spring mechanism.....J. H. Graham
Car fender.....C. Goehring
Car fender.....P. Best
Car. Mine.....F. C. Hockensmith
Car seat.....S. M. Curwen
Car underframe.....W. P. Bettendorf
Car wheel lubricating device. Mine.....J. N. Maxwell
Cars or trains. Electric safety apparatus for.....W. P. Robertson
Carburetor.....J. C. Thompson
Carpet clamp.....L. Grape
Cartridge cleaning apparatus.....P. Butler
Cartridge shell priming machine.....P. Butler
Cash register.....2 pats. W. H. Muzzy
Cash register.....W. F. St. Clair
Castings, &c. Repairing.....J. H. Gravell
Cattle guard.....J. F. & F. H. Woodin
Cement. Making white.....E. Gogler
Cement posts. Making.....L. H. Stoner
Cement work tool.....O. M. Jumper
Centrifugal machine.....J. J. Berrigan
Chain.....C. A. Mann
Circle comb.....J. Robertson
Circuit changing apparatus.....H. G. Webster
Cleaning implement.....J. Dettmer
Clock. Intermittent alarm.....A. M. Lane
Clod crusher and cultivator.....J. W. Jones
Clothes line sheave.....C. S. Rollston
Clover buncher.....E. E. Culp
Clutch. Automatic.....T. C. Dexter et al
Coherer.....W. W. Massie
Coke oven discharging implement.....A. J. Doss
Coke oven discharging machine.....H. King
Coke oven discharging machine.....A. J. Doss
Coke puller.....2 pats. J. E. Jones et al
Coke puller.....2 pats. J. E. Jones
Coke puller.....H. King
Coke puller.....F. C. Somes
Coke puller.....2 pats. H. King
Coke puller. Mechanical.....F. C. Stones
Concrete cisterns or tanks. Apparatus for making.....J. Wearth
Condenser.....A. Koestner et al
Confectionery machine.....W. L. Ruhe
Controller.....R. P. Jackson
Conveyer. Portable.....J. Ainsworth
Cooler.....W. S. Colwell
Corn husking machine.....C. & J. S. Borden
Corn sheller.....A. Anderson
Cotton cleaning apparatus.....S. D. Murray
Cotton chopper.....B. A. Henley
Coupling.....H. Gallager
Coupling link.....J. Holms, Jr
Coverings, blocks, and slabs. Manufacture of non conducting.....2 pats. H. C. Michell
Cue tip holder.....J. G. Meyer
Cultivator.....S. E. Bailor
Cultivator. Cotton attachment.....G. Willis
Curtain attachment.....C. G. Hensley
Curtain pin.....R. M. Seward
Curtain rod.....W. S. Adams
Cuspidor.....T. E. Rieker et al
Cycle. Foot.....H. Glade
Dampening machine. Shirt.....A. M. & J. E. Halstead
Deaf. Signal for the.....A. Ekberg
Dental dam clamp.....J. W. Ivory
Dental tooth pin pointing tool.....L. H. C. de Fernelmont et al
Dentists' instrument holder.....F. G. Hullhorst
Developing device. Dry plate.....W. Bullock
Dispensing apparatus.....2 pats. E. E. Murphy
Display stand.....M. W. Reeves
Door hanger.....F. W. Miller
Door or window guard. Cell.....D. N. Gesner et al
Drain venting system. House.....M. J. Garvin
Drawing and measuring device. Angle.....E. C. Trisler
Dredging means.....N. H. & R. H. F. Sewall
Drier.....2 pats. J. E. Turney
Drill tube.....W. A. Van Brunt
Dumping apparatus.....R. H. Stevens
Duplicating apparatus. Stencil.....A. B. Dick
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Electric furnace.....R. Radatz
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Electric spark gap.....T. B. Kinraide
Electric switch.....4 pats. I. G. Waterman
Electric testing clip.....H. Frankel
Electric timeswitch.....H. K. Gardner
Electrical distribution system.....P. M. Lincoln
Electrical impulses. Apparatus for receiving.....D. W. Troy
Electrical impulses. Selecting.....D. W. Troy

Electrically treating materials.....W. S. Franklin
Electrode. Self-contained hand.....T. B. Kinraide
Electromagnet.....W. Meyer
Electroplating isolated designs on vitreous surfaces.....L. Blower
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Elevator stop. Automatic.....F. W. Hackmann
Engine controlling and governing gear. Pressure.....E. Crowe
Engine cylinder cooling system. Internal combustion.....C. W. Hart
Engine safety attachment. Hoisting.....F. W. Lyon
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Excavating machine.....R. C. Canfield
Explosion motor.....F. Henriod-Schweizer
Explosive engine.....J. S. Losch
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Feed water heater.....B. J. White
Feeder. Automatic boiler.....H. J. Davis et al
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File. Bill.....I. P. Womble
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Fire escape.....J. Wenig
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Flowers on graves alive. Device for keeping.....L. Maurer
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Garbage or offal and removing the oil or grease therefrom. Apparatus for cooking.....C. S. Wheelright
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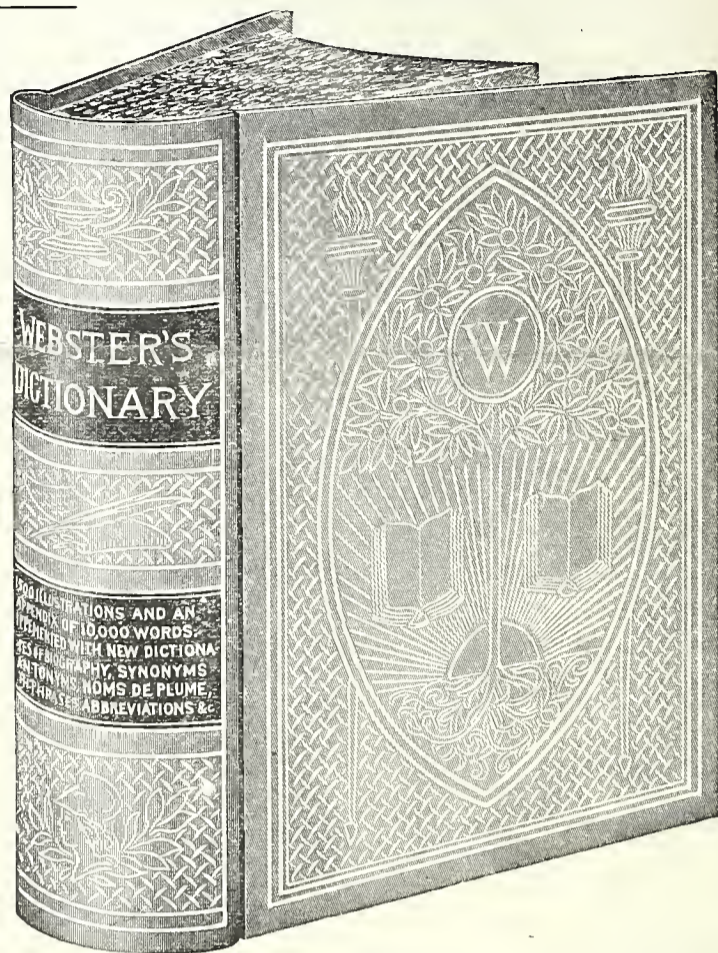
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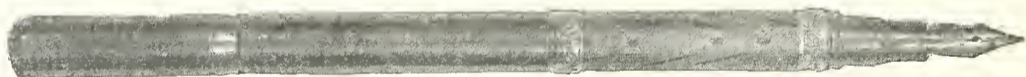
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